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OF THE COLUMBIA RIVER BASIN, MONTANA,
WITH PRELIMINARY PROJECTIONS TO 1980, 2000, AND 2020

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PREFACE

This report includes some preliminary phases of a Type IV U.S. Department of Agriculture, State of Montana, study of land and related water resources in the Clark Fork of the Columbia River drainage in Montana. The purpose of the publication is to present some basic economic data in convenient form to all participants in the study.

The Economic Base portion of the study is largely descriptive in nature, as it must be at this stage of the study. The Projections section of the report makes an adaptation of the OBERS Series C projections to the Clark Fork study area, and evaluates the OBERS projections of food and fiber as a without-public-water-development projection.

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SUMMARY

This report was prepared to provide economic and related data to planners working for the wise use of land and water resources of the Montana portion of the Clark Fork drainage of the Columbia River Basin. The agricultural sector is emphasized, but some characteristics of other sectors are also presented.

The study area contains 29 percent of the total state population. The 50-year average annual growth rate has been roughly .7 of 1 percent, slightly higher than the state average for the same period, but considerably below the 50-year U.S. average. The relative position of the study area is projected to continue. Population in the study area is projected to increase from 203,618 in 1970 to 284,465 in 2020. This represents an increase of 40 percent over the 50-year period. Projected average annual increase for the study area is about one-quarter of 1 percent for the period 1970-2020.

The percentage of the population employed has increased slightly, historically, and that trend is projected to continue. Employment participation rate (employment/population) is considerably lower in the Flathead subarea than in the Upper and Lower Clark Fork.

Per capita personal income for the study area is lower than for the state as a whole. Per capita income is projected to increase almost five-fold by 2020.

In the last decade the number of farms within the study area declined by about half, but the average value of products sold per farm increased three-fold. Eighty percent of recent farm sales have been livestock and livestock products. Of the 3,930 farms in the study area in 1969, Only 235, or 6% ~~about 2,500, or 64 percent~~, had annual sales of $40,000 or more. Nearly one-fourth of the farms in the study area are part-time. Tenancy on farms within the study area is quite negligible. Tenants in general are the younger farmers, and the percentage of operators who are tenants declines rapidly as age of operator increases.

Value of land and buildings in farms within the Clark Fork study area exceeds the state average when viewed from a per-acre-in-farms perspective, but is considerably below the state average on a per-farm basis.

Under the OBERS baseline projections, output of livestock and livestock products will slightly more than double current output by 2020. Two alternative projections of agricultural crops are considered. One level of projected output is based upon the current normal acreage and cropping pattern and projected yields, or a non-development projection. The second projection is the OBERS level. The data indicates some additional land would have to be developed to attain the OBERS projected level of output for Years 2000 and 2020 (see table 33).

THE ECONOMIC BASE OF THE CLARK FORK OF THE COLUMBIA RIVER BASIN, MONTANA, WITH PRELIMINARY PROJECTIONS TO 1980, 2000, AND 2020

by

Lynn W. Wilkes[1]

INTRODUCTION

Purpose and Scope

A Type IV cooperative survey of the Clark Fork of the Columbia River Basin in Montana was initiated in July 1971 by the Montana Department of Natural Resources and Conservation and the U.S. Department of Agriculture. The survey is scheduled to continue through fiscal year 1976. A primary immediate objective for the data in this report is to develop an economic framework that would serve as a basis for comprehensive planning of water and related land resources in the study area.

The current economic base reflects the present use of natural resources and some problems associated with their use. The preliminary projections are essentially based upon the OBERS forecasts, and represent an extrapolation of past trends; hence, they may be regarded as a general direction and magnitude of change in the light of past trends. They are a baseline projection from which alternative levels of change may be viewed and their impacts evaluated.

Projections for small geographic areas are much less reliable than those for larger entities. The Clark Fork Type IV study area and its subareas are small when considered for projection purposes. It conforms to the Water Resource Council subarea 1702 (Pend O'Reille) if two counties are excluded, one in Idaho and one in Washington. The preliminary projections for the Clark Fork represent the OBERS rates of change applied to the Montana portion of WRC subarea 1702, as nearly as can be ascertained.

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Delineation of the Study Area and Subareas

The watershed has long been recognized as a "proper" unit for planning purposes. The concept recognizes the intimate relationship of land particularly, and many other resources generally, to water. This has been especially true in the Western United States. During the period roughly from the early 1930s until the end of World War II, regional planning meant the development of water resources and related land within a given river basin. Although in recent years the metropolitan region has attracted increasing attention as a planning area, the watershed retains its relative importance.

While the major planning efforts have been associated with large, well-known "watersheds" - the Tennessee Valley, the Columbia Basin, the Missouri Valley - the concept is evident, even in the conduct of Type II and Type IV studies in smaller watersheds.

The Clark Fork of the Columbia River Basin in Montana includes all of the area west of the Continental Divide, except the drainage of the Kootenai River and its tributaries. The initial source of the Clark Fork River is along the Continental Divide in the Highland Mountains south of Butte, Montana. From this source it flows northwest to join the Columbia River. Enroute it picks up the flows of the Blackfoot, Bitterroot, St. Regis, and Flathead Rivers. The basin is about 170 miles wide from east to west, and 240 miles long from north to south. It contains approximately 21,833 square miles.

Economic data needed for analyses are largely available and reported for areas as defined by political boundaries. Natural drainage areas seldom conform to political boundaries. Gathering data for the study area and its subareas presents some problems, as most economic statistical data which are available are summarized on a county level. The representative-county approach was used in defining the economic boundaries of the study area. If all, or a major portion, of economic activity of a county occurs within the drainage area, it was included in the study area. Conversely, those counties which lie partly within the hydrologic boundaries of the study area, but whose major economic activity lies outside the natural drainage area, were excluded. Table 1 lists the counties included in each of the economic subareas, and total area included for economic analysis.

Table 1.-Counties included in study area and subareas for economic analysis

Clark Fork of Columbia River Basin, Montana		
Flathead subarea	Lower Clark Fork subarea	Upper Clark Fork subarea
Flathead	Missoula	Deer Lodge
Lake	Mineral	Granite
	Sanders	Powell
	Ravalli	Silver Bow

ECONOMY OF CLARK FORK STUDY AREA, BASE PERIOD

The Clark Fork of the Columbia River Basin in Montana, hereafter referred to as the Clark Fork study area, is an area which is mostly mountainous and forested. It contains contrasting and beautiful landscapes which draw increasing numbers of tourists to the area, large acreages of natural and improved grassland and hayland for a thriving livestock industry, and minerals for important mining and smelting operations.

The study area has extensive water resources, but rather limited arable lands. Long-term runoff has annually averaged 15.3 million acre-feet, and has contributed about 10 percent of the volume of the Columbia River at its mouth. In recent years about 73 percent of total cropland harvested has been irrigated. In addition to the harvested cropland, there has been about 160,000 acres of pastureland irrigated.

The history of the area has been closely linked to mining, and later to both mining and smelting of minerals. The history and development of this industry is amply documented elsewhere.

Climate varies considerably for the relatively small area. Precipitation at Hamilton averages about 13 inches. Further north, Missoula receives 12.7 inches, and Kalispell 16.1 inches. Enough of the precipitation occurs during the summer growing period that dryland farming is quite widespread. However, relatively dry belts exist in the "rain shadow" of the major mountain ranges.

Demographic Characteristics

The 1970 population of the Clark Fork Study Area totaled 203,658 inhabitants (table 2). The study area contains 29 percent of the total state population. The 50-year average annual growth rate has been roughly .7 of 1 percent, slightly higher than the state average for the same period, .5 of 1 percent, and considerably below the 50-year U.S. average of 1.9 percent. Between the decennial years 1930-1940, the average growth rate of the study area was an even 1.0 percent per year. In subsequent decennial periods the average annual growth rate equalled .7, .6, and .8 of 1 percent respectively. The following tabulation shows the study area growth, compared with other geographic entities.

Area	1970 Index[1/]
United States	165
Mountain States	232
Pacific Northwest	206
Montana	129
Clark Fork Study Area	135

[1/] 1930 population equals 100.

Population change has varied among the economic subareas of the Clark Fork. The most rapid and most consistent growth has occurred in the Flathead subarea. In two decennial periods, 1920-1930 and 1930-1940, the average annual growth rate was 2.8 percent. The slowest growth rate occurred during the 1950-1960 period, at only .2 of 1 percent annually. The 1960-1970 average growth rate was 1.6 percent, and the 50-year average annual growth rate for the Flathead subarea was 1.8 percent.

Population growth in the Lower Clark Fork subarea has roughly paralleled that of the Flathead. Except for a small decline during the 1920-1930 period, Table 2.-Total population, Clark Fork Study Area, by county and subarea, 1920-1970

Item	1920	1930	1940	1950	1960	1970
			Number			
Flathead	21,705	19,200	24,271	31,495	32,965	39,460
Lake	1/	9,541	13,490	13,835	13,104	14,445
FLATHEAD SUBAREA	21,705	28,741	37,761	45,330	46,069	53,905
Missoula	24,041	21,782	29,038	35,493	44,663	58,263
Mineral	2,327	1,626	2,135	2,081	3,037	2,958
Sanders	4,903	5,692	6,926	6,983	6,880	7,093
Ravalli	10,098	10,315	12,978	13,101	12,341	14,409
LOWER CLARK FORK SUBAREA	41,369	39,415	51,077	57,658	66,921	82,723
Deer Lodge	15,323	16,293	13,627	16,553	18,600	15,652
Granite	4,167	3,013	3,401	2,773	3,014	2,737
Powell	6,909	6,202	6,152	6,301	7,002	6,660
Silver Bow	60,313	56,969	53,207	48,422	46,454	41,981
UPPER CLARK FORK SUBAREA	86,712	82,477	76,387	74,049	75,070	67,030
Total study area	149,786	150,633	165,225	177,037	188,060	203,658
Total state	548,889	537,606	559,456	591,024	674,767	694,409
Area, percent of state	27.3	28.0	29.5	30.0	27.0	29.3

1/ County not formed at this date.

U.S. Census of Population.

there has been a consistent growth during the past 50 years. The period of most rapid growth was 1930-1940, when average growth rate was 2.7 percent. The 50-year average for the Lower Clark Fork was 1.4 percent, and for the most recent decennial period, 1960-1970, it has been 2.2 percent.

The Upper Clark Fork subarea has almost consistently declined in population during the past 50 years. With the exception of the period 1950-1960, when there occurred a small increase, the average annual decrease for decennial periods has ranged from -.3 of 1 percent (1940-1950) to -1.0 percent for the most recent period, 1960-1970. The average annual decline for the 50-year period averaged -.5 of 1 percent.

There are no standard metropolitan statistical areas within the Clark Fork study area, nor are there cities classified as urbanized under the Bureau of Census definitions. The urban population in the study area are persons living in places of 2,500 inhabitants or more, outside urbanized areas. The three largest cities are Missoula, 29,497; Butte, 23,368; and Kalispell, 10,526.

In 1970 about 47 percent of the total population of the study area was classified as rural, and 53 percent urban. The 1930 rural-urban ratio for the study area was the same as the present ratio, and it has not varied greatly since that time. There has occurred, however, a modest increase in the number of the rural non-farm population (table 3). For the study area, the percentage rural non-farm increased 3 percentage points from 1960 to 1970. Both the Flathead and Upper Clark Fork had increases in that category, while the Lower Clark Fork declined slightly. There is a fairly large Indian population in the study area, particularly in the Flathead. Other non-Caucasian groups are not large (table 4).

Population densities for the census years 1950 through 1970 were computed from square miles included within the economic subregion boundaries. The Clark Fork study area is more densely populated than the State of Montana as a whole, but is also very sparsely populated. The Flathead subarea is the least populated, with 7.8 inhabitants per square mile in 1970 (table 5). The Upper Clark Fork is the most densely populated of the three subareas, with 12.1 inhabitants

Table 3.-Rural farm, rural non-farm, and urban population, Clark Fork study area, by county and subarea, 1960 and 1970[1/]

Item	1960						1970					
	Rural				Urban		Rural				Urban	
	Farm	Percent	Non-farm	Percent	Total	Percent	Farm	Percent	Non-farm	Percent	Total	Percent
	Number		Number		Number		Number		Number		Number	
Flathead...........	3,932	10	19,033	48	16,495	42	3,665	11	16,184	49	13,116	40
Lake...............	3,428	24	11,017	76	0	0	4,415	34	8,689	66	0	0
FLATHEAD SUBAREA..	7,360	14	30,050	56	16,495	30	8,080	18	24,873	54	13,116	28
Missoula...........	1,060	2	13,766	24	43,531	74	1,551	3	12,205	27	30,907	69
Mineral............	179	6	2,897	94	0	0	192	6	2,845	94	0	0
Sanders............	1,507	21	5,586	79	0	0	1,541	22	5,339	78	0	0
Ravalli............	2,875	20	11,528	80	0	0	3,808	31	8,533	69	0	0
LOWER CLARK FORK..	5,621	7	33,777	41	43,531	52	7,092	11	28,922	43	30,907	46
Deer Lodge.........	456	3	5,425	35	9,771	62	573	3	6,313	34	11,714	63
Granite............	476	17	2,400	83	0	0	712	24	2,302	76	0	0
Powell.............	631	9	1,518	23	4,511	68	846	12	1,475	21	4,681	67
Silver Bow.........	225	1	7,670	18	34,032	81	283	1	6,019	13	40,152	86
UPPER CLARK FORK..	1,788	3	17,013	25	48,314	72	2,414	3	16,109	21	56,547	76
Total study area....	14,769	7	80,840	40	108,340	53	17,586	10	69,904	37	100,570	53
Total state.........	88,460	13	233,605	34	372,955	53	105,598	16	230,712	34	338,457	50

1/ Data are based on sample, and will not always total to county census totals for smaller counties.

U.S. Census of Population.

Table 4.-Ethnic characteristics of the population, Clark Fork study area, by county and subarea, 1970

Item	Total population	Number white	Percent	Number Indians	Percent	Number all others	Percent
Flathead	39,460	38,991	98.8	327	00.8	142	00.4
Lake	14,445	12,202	84.5	2,199	15.2	44	00.3
FLATHEAD SUBAREA	53,905	51,193	94.9	2,526	4.7	186	00.4
Missoula	58,263	57,321	98.4	660	01.1	282	00.5
Mineral	2,958	2,936	99.3	16	00.3	6	—
Sanders	7,093	6,697	94.4	384	05.4	12	00.2
Ravalli	14,409	14,132	98.1	142	01.1	135	00.8
LOWER CLARK FORK SUBAREA	82,723	81,086	98.0	1,202	01.5	435	00.5
Deer Lodge	15,652	15,284	97.6	240	01.5	128	00.9
Granite	2,737	2,716	99.2	20	00.8	1	—
Powell	6,660	6,539	98.2	98	01.5	23	00.3
Silver Bow	41,981	41,133	98.0	359	00.9	489	01.1
UPPER CLARK FORK SUBAREA	67,030	65,672	98.0	717	01.1	641	00.9
Total area	203,658	197,951	97.2	4,445	02.2	1,262	00.6
Total state	694,409	663,043	95.5	27,130	03.9	4,236	00.6

U.S. Census of Population.

Table 5.-Population density per square mile, Clark Fork study area, by county and subarea, 1950-1970

Item	Square miles	1950		1960		1970	
		Population	Density	Population	Density	Population	Density
Flathead	5,280	31,495	6.0	32,965	6.2	39,460	7.5
Lake	1,655	13,835	8.4	13,104	7.9	14,445	8.7
FLATHEAD SUBAREA	6,935	45,330	6.5	46,069	6.6	53,905	7.8
Missoula	2,624	35,493	13.5	44,663	17.0	58,263	22.2
Mineral	1,223	2,081	1.7	3,037	2.5	2,958	2.4
Sanders	2,819	6,983	2.5	6,880	2.4	7,093	2.5
Ravalli	2,388	13,101	5.5	12,341	5.2	14,409	6.0
LOWER CLARK FORK SUBAREA	9,054	57,658	6.4	66,921	7.4	82,723	9.1
Deer Lodge	741	16,553	22.3	18,640	25.2	15,652	21.1
Granite	1,737	2,773	1.6	3,014	1.7	2,737	1.6
Powell	2,340	6,301	2.7	7,002	3.0	6,660	2.8
Silver Bow	716	48,422	67.6	46,454	64.9	41,981	58.6
UPPER CLARK FORK SUBAREA	5,534	74,049	13.4	75,070	13.6	66,990	12.1
Total area	21,523	177,037	8.2	188,060	8.7	203,618	9.5
Total state	147,138	591,024	4.0	674,767	4.6	694,409	4.7

Computed from data in Census of Population and Montana Data Book.

per square mile. The Lower Clark Fork had a population density of 9.1 in 1970. The average density for the study area as a whole was 9.5 in 1970.

Age conditions practically all social phenomena. The age-group factor is closely related to the birth rate, the mortality rate, marital status, and the incidence of migration. The proportions of the population under 15, between 15 and 65, and those aged 65 and over differ drastically from county to county and, to a lesser degree, from state to state in the United States. One would expect less deviation in the age groups from region to region within a state, but some variations are evident, even between the subareas of the Clark Fork study area.

The Flathead subarea has a larger percentage of its population under age 15 than either the state, the average for the Clark Fork study area, or the other subareas (figure 1). Various factors play a part in this rather unique age distribution in the Flathead. The aluminum plant at Columbia Falls attracts employees who have younger families. Also, the Indian Reservation contains larger families than is average in the study area. The Upper Clark Fork subarea has a proportionately higher share of its inhabitants in the age group 40-64 (figure 2), and the Lower Clark Fork has considerably more persons between the ages of 15 and 39 than the state or other subareas (figure 3). The University of Montana at Missoula obviously has an impact on this age group.

Employment

An indicator of major importance, employment data, reflects the major econom forces prevalent in the study area. These historic and current data serve a dual function. They outline the sectors which, in the past, have shown expansion or decline, and also provide the base and framework upon which employment projection may be made for inclusion in a subsequent section of this report. Two major sources of employment data for the study area are available - the Decennial Census and the Montana State Employment Security Division. Although both sources are utilized in the conduct of this study, the data in the following employment series, for the study area and its subareas, are based on decennial census data.

Employment trends generally parallel population. The employment participation rate (Employment/Population) for the study area is approximately the same as

FIGURE 1 AGE AND SEX DISTRIBUTION OF POPULATION, FLATHEAD SUBAREA, WITH COMPARISON WITH TOTAL STUDY AREA AND WITH STATE 1970

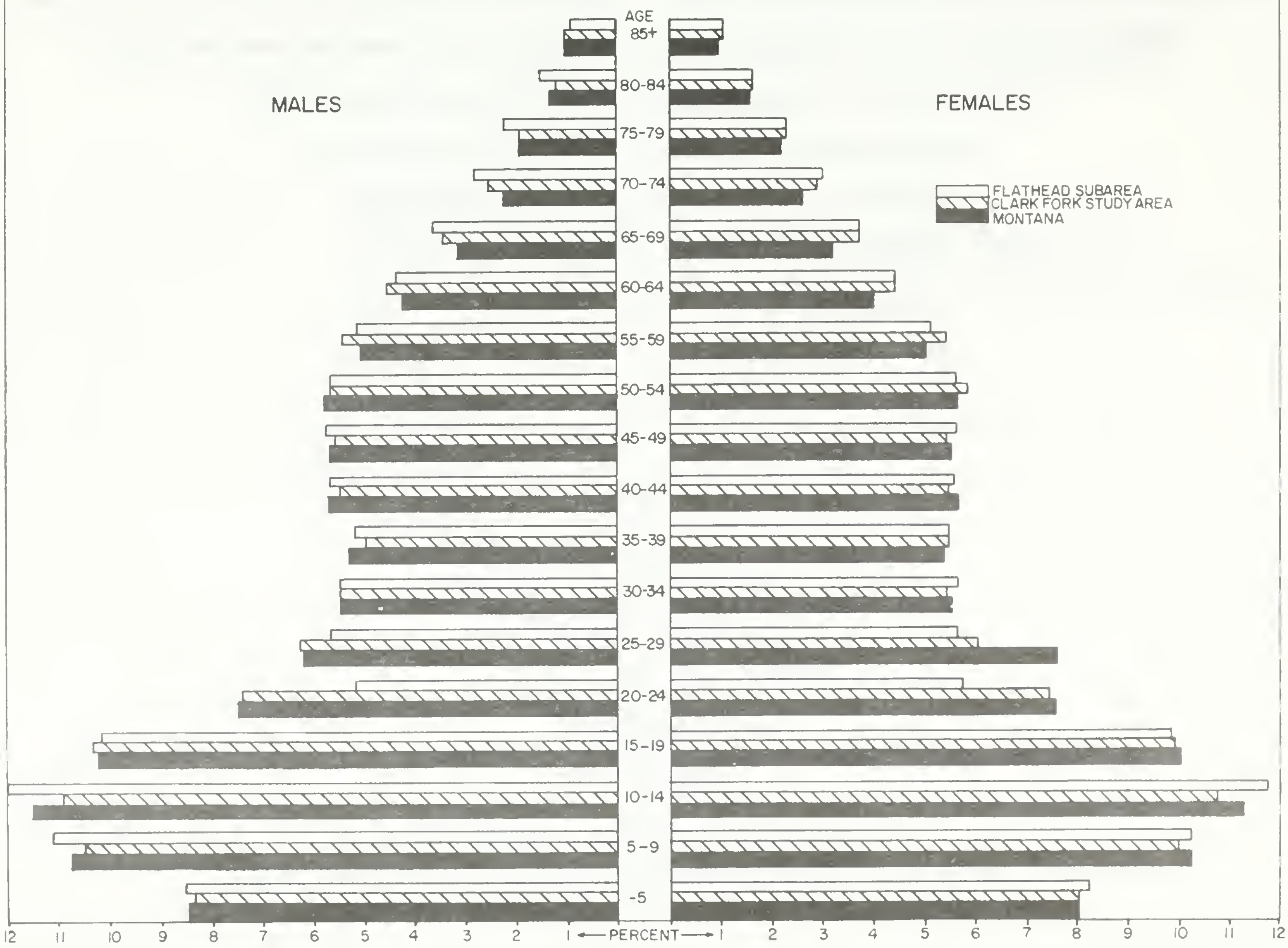


FIGURE 2 AGE AND SEX DISTRIBUTION OF POPULATION, UPPER CLARK FORK SUBAREA, WITH COMPARISON WITH TOTAL STUDY AREA AND WITH STATE 1970

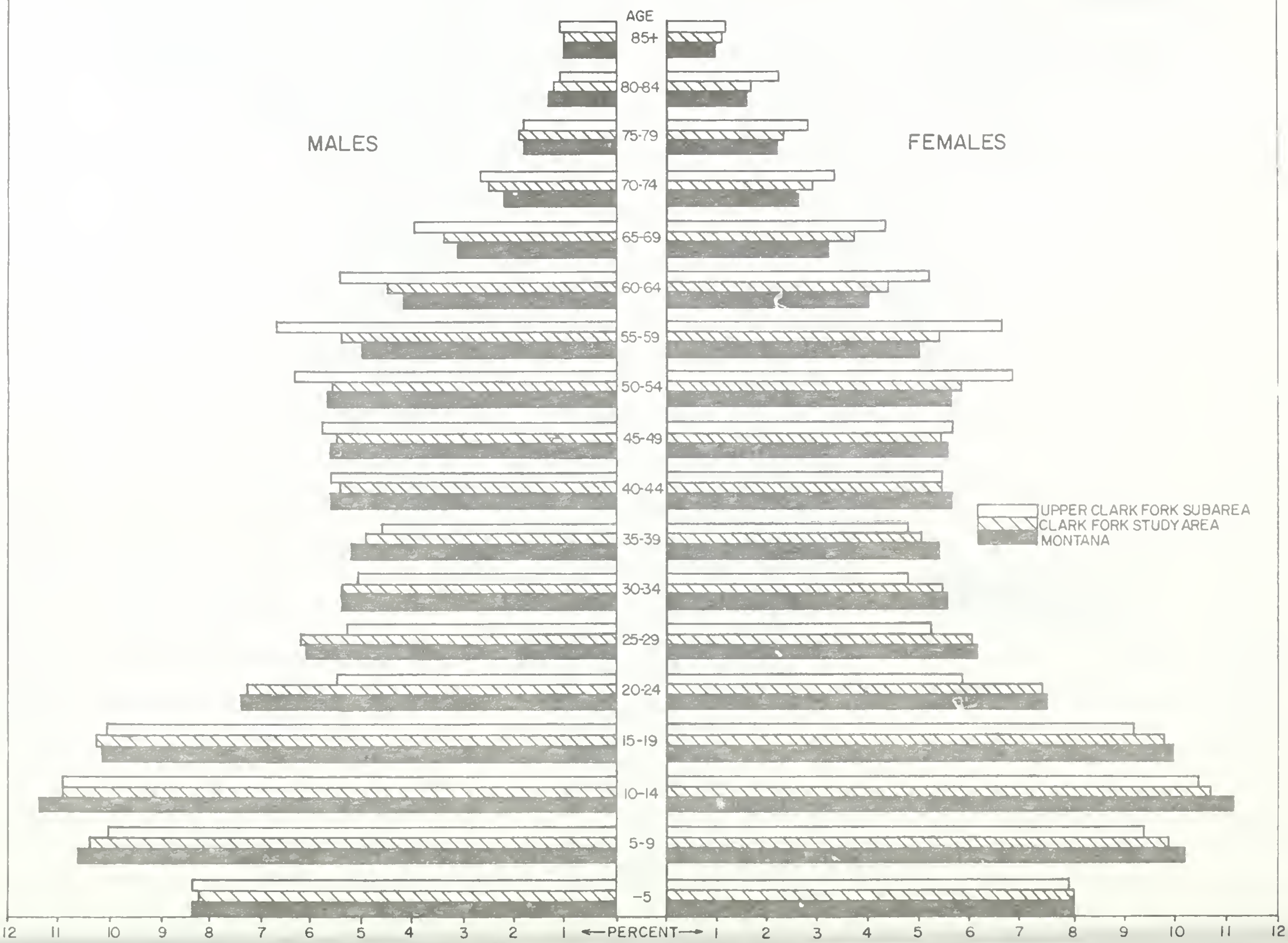
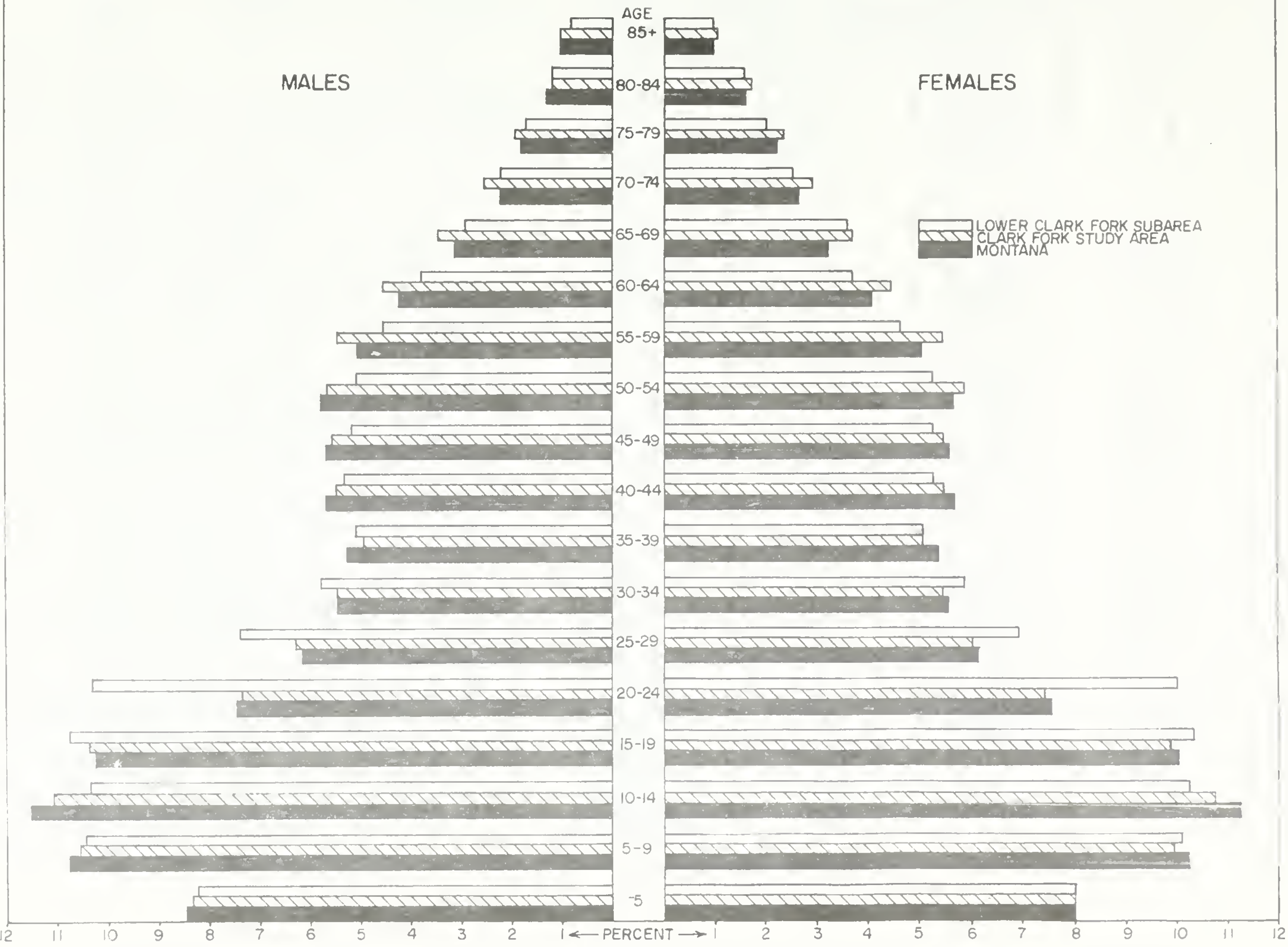


FIGURE 3 AGE AND SEX DISTRIBUTION OF POPULATION, LOWER CLARK FORK SUBAREA, WITH COMPARISON WITH TOTAL STUDY AREA AND WITH STATE 1970



for the state - 34.0 and 35.2 percent respectively in 1970. This rate tends to be fairly uniform throughout the subareas of the Clark Fork, but the Flathead subarea does have a slightly lower participation rate than the Lower and Upper Clark Fork subareas, with 31.1 percent for Flathead, and 35.5 and 34.2 percent for Lower and Upper Clark Fork respectively.

Employment in the study area totaled 69,322 in 1970 according to the decennial census. This was 28 percent of the total state employment. Since 1940, total employment for the study area has expanded at an average annual rate of .7 of 1 percent, increasing from 54,334 in 1940 to 69,322 in 1970 (table 6). Employment in the Flathead subarea and the Lower Clark Fork subarea has increased at a more rapid rate than population (tables 7 and 8). In the Upper Clark Fork, employment has declined at about the same rate as population (table 9).

Agricultural employment in the study area has conformed to national and state trends. Farm consolidation and enlargement and increasing mechanization has resulted in a decrease in agricultural employment, both in absolute numbers and in percentage of total employment. Part-time farming is prevalent, with many farmers maintaining their farm residence but commuting to a nearby town or city for employment, at least part of the year.

Mining employment is concentrated in the Upper Clark Fork subarea, where the open-pit copper mining operation is one of the primary economic activities. Employment in mining has declined significantly since 1940. Average annual decline in the 1940-1950 decennial period was 2.4 percent, and the decline in the 1950-1960 period even greater - 3.4 percent. Employment in mining leveled off somewhat during the past 10 years, with an average annual decline of only 1.7 percent. The decline in the number of persons employed in mining reflects the technological advances in the industry during the past two decades, which have significantly increased output per man-hour. Most of the mining activity of the subarea has been metal mining, although a nominal number of employees are engaged in mining of phosphate in Granite and Powell Counties, some gold and silver, and sapphires on a small scale. Sand and gravel is mined to meet construction needs.

Although construction employment has shown considerable stability during the

Table 6.-Population, participation rate, and employment, by industry, Clark Fork study area, 1940-1970

Item	1940	1950	1960	1970
	Number			
Population	165,225	177,037	188,060	203,658
Participation rate (employment/population)	32.9	35.8	33.2	34.0
Total employment	54,334	63,353	62,449	69,322
Employment by industry:				
Agriculture, forestry, & fishery	9,667	8,841	6,267	5,524
Mining	8,464	6,484	4,064	3,419
Contract construction	2,515	4,222	3,387	3,921
Food & kindred products manufacturing	861	1,045	1,083	502
Lumber & wood products manufacturing	2,306	3,262	4,153	4,732
Printing & publishing	535	629	781	665
Chemicals & allied products manufacturing	36	65	254	282
Primary metals & fabricated metals	2,042	3,355	3,250	2,948
Machinery manufacturing	140	137	169	197
All other manufacturing	284	325	542	1,201
Transportation, communications, & public utilities	4,636	6,525	5,874	5,550
Wholesale & retail trade	8,946	12,013	12,560	14,891
Finance, insurance, & real estate	994	1,346	1,912	2,418
Lodging & personal services	2,197	2,441	2,130	2,703
Business & repair service	1,037	1,663	1,220	1,412
Entertainment & recreational services	531	621	504	524
Private households	1,187	919	1,453	851
Medical, educational, & others	4,131	6,079	8,830	14,571
Government	3,006	2,256	2,913	3,011
Industry not reported	819	1,125	1,103	--

U.S. Census of Population.

Table 7.-Population, participation rate, and employment, by industry, Flathead subarea, 1940-1970

Item	1940	1950	1960	1970
	Number			
Population	37,761	45,330	46,069	53,905
Participation rate (employment/population)	28.8	32.6	31.2	31.1
Total employment	10,877	14,817	14,376	16,785
Employment by industry:				
Agriculture, forestry, & fishery	3,803	3,372	2,199	1,733
Mining	100	30	18	22
Contract construction	706	1,717	678	1,151
Food & kindred products manufacturing	126	167	186	71
Lumber & wood products manufacturing	972	1,149	1,375	1,822
Printing & publishing	67	115	184	114
Chemicals & allied products manufacturing	1	7	--	41
Primary metals & fabricated metals	9	20	583	977
Machinery manufacturing	18	24	41	71
All other manufacturing	53	67	111	278
Transportation, communications, & public utilities	974	1,788	1,326	1,320
Wholesale & retail trade	1,657	2,654	3,215	3,774
Finance, insurance, & real estate	137	264	413	562
Lodging & personal services	351	465	517	702
Business & repair service	253	495	316	378
Entertainment & recreational services	90	129	111	118
Private households	270	242	425	170
Medical, educational, & others	772	1,132	1,743	2,631
Government	369	526	726	850
Industry not reported	149	454	209	--

U.S. Census of Population.

Table 8.-Population, participation rate, and employment, by industry, Lower Clark Fork subarea, 1940-1970

Item	1940	1950	1960	1970
		Number		
Population	51,077	57,658	66,921	82,723
Participation rate (employment/population)	33.7	35.8	34.7	35.5
Total employment	17,220	20,654	23,248	29,426
Employment by industry:				
Agriculture, forestry, & fishery	4,395	4,126	2,997	2,726
Mining	217	73	61	50
Contract construction	1,137	1,450	1,626	1,723
Food & kindred products manufacturing	352	445	515	257
Lumber & wood products manufacturing	1,150	1,943	2,566	2,505
Printing & publishing	163	202	284	267
Chemicals & allied products manufacturing	5	16	3	18
Primary metals & fabricated metals	19	28	52	47
Machinery manufacturing	25	28	56	72
All other manufacturing	87	95	323	786
Transportation, communications, & public utilities	1,470	2,076	2,216	2,326
Wholesale & retail trade	2,872	3,933	4,513	6,644
Finance, insurance, & real estate	349	452	819	1,118
Lodging & personal services	728	922	873	1,209
Business & repair service	370	620	503	718
Entertainment & recreational services	134	241	171	276
Private households	438	348	549	377
Medical, educational, & others	1,410	2,507	3,759	7,328
Government	1,726	755	1,012	979
Industry not reported	173	394	350	--

U.S. Census of Population.

Table 9.-Population, participation rate, and employment, by industry, Upper Clark Fork subarea, 1940-1970

Item	1940	1950	1960	1970
	Number			
Population	76,387	74,049	75,070	67,030
Participation rate (employment/population)	34.3	37.6	32.9	34.4
Total employment	26,237	27,882	24,825	23,111
Employment by industry:				
Agriculture, forestry, & fishery	1,469	1,343	1,071	1,065
Mining	8,147	6,381	3,985	3,347
Contract construction	672	1,055	1,083	1,047
Food & kindred products manufacturing	383	433	382	174
Lumber & wood products manufacturing	184	170	212	405
Printing & publishing	305	312	313	284
Chemicals & allied products manufacturing	30	42	251	223
Primary metals & fabricated metals	2,014	3,307	2,615	1,924
Machinery manufacturing	97	85	72	54
All other manufacturing	144	163	108	137
Transportation, communications, & public utilities	2,192	2,661	2,332	1,904
Wholesale & retail trade	4,417	5,426	4,832	4,473
Finance, insurance, & real estate	508	630	680	738
Lodging & personal services	1,118	1,054	740	792
Business & repair service	414	548	401	316
Entertainment & recreational services	307	251	222	130
Private households	479	329	479	304
Medical, educational, & others	1,949	2,440	3,328	4,612
Government	911	975	1,175	1,182
Industry not reported	497	277	544	--

U.S. Census of Population.

last decade, the industry was highly volatile during the 1940-1960 period. Although the tables do not show annual data, employment in the construction industry has shown noticeable change within decennial periods which reflect changing economic trends within the study area.

Employment in the manufacturing industries in 1970 comprised 15 percent of total employment for the study area. The durable goods industries were dominant, with lumber and wood products and primary metals manufacturing the primary employers. Although employment in primary metals declined somewhat during the past decade, there occurred some expansion in the lumber and wood products sector, resulting in a net increase for the durable goods industries as a group.

Food and kindred products manufacturing sector has been the largest employer for the non-durable goods industries until recently, when sugar beet processing was discontinued in the study area. In 1970, printing and publishing employed more people. Employment trends in transportation and utilities within the study area follow rather closely the state trend for these industries. Employment increased through the period 1940-1960, and then declined slightly in the decennial period 1960-1970. Employment in the transportation sector has increased during the latter part of the last decade. Even employment on the railways has increased in Western Montana, while decline has been the trend in most areas of the nation. Communications and public utilities have generally enjoyed significant productivity increases per employee, which has dampened employment expansion on those industries.

Growth in trade employment within the study area has been persistent throughout the 30-year period 1940-1970. Growth was greatly accelerated in the 1940-1950 period, averaging 3 percent annually. The growth rate slowed in the following decade to only .4 of 1 percent annually, then accelerated again to 1.7 percent between 1960 and 1970. Expansion of the trade sector, state-wide, has exceeded growth within the Clark Fork study area, but only by a small margin. The 30-year average annual growth rate for the state was 2.0 percent, and 1.7 percent for the study area.

Employment in the finance, insurance, and real estate sector has been characterized by extraordinary expansion. The growth rate over a 30-year period in the study area averaged 3 percent annually, and far exceeded the growth in total employment for the same period. This rapid expansion in the finance sector has been state-wide, with the rate of growth state-wide exceeding that of the study area by a small margin.

Employment in most of the service categories has shown modest expansion, except for employment in private households and medical and educational institutions. These two sectors are widely divergent in their changing role. Private household employment has historically been low in the study area, and only slightly more significant state-wide. Employment in private households declined both in the study area and state-wide during the past decade. Medical and educational services employment has expanded rapidly and persistently. Net increases occurred during every decennial period since 1930. The average annual increase for medical and educational services in the study area has been 4.3 percent for the past 30 years, and 5.1 percent for the past 10 years. Governmental employment has not expanded within the study area as it has state-wide and generally throughout the nation. The total for the study area in 1970 was almost exactly the same as in 1940. Table 10 presents data for the State of Montana, for comparison with study and subarea data.

Personal Income

Measurements of personal income are highly sensitive indicators of economic and business conditions in a regional economy. Total personal income is payment received in aggregate by individuals, both as payment for factor services, including labor, and as transfer payments from government and business, but not from individuals. Personal income may be measured either at the point at which income payments are made or by considering total personal expenditures plus savings. However, this social account is somewhat more inclusive than mere income payments to individuals, in that personal income includes an estimate of the imputed value of rents on owner-occupied dwellings. Also, nonprofit organizations and private trusts, pension, and health and welfare funds are treated as persons in computing the personal income account.

Table 11 presents total personal income for a historical series, selected years 1929 through 1970 for the Clark Fork study area and three economic subareas.

Table 10.-Population, employment by industry, State of Montana, with percent Clark Fork study area of state total, 1940-1970

Item	1940		1950		1960		1970	
	State total	Percent	State total	Percent	State total	Percent	State total	Percent
Population	559,456	29.5	591,024	29.9	674,767	27.8	694,409	29.3
Total employment	185,564	29.2	218,460	29.0	231,270	27.0	244,608	28.3
Employment by industry:								
Agriculture, forestry, & fishery	59,778	16.1	54,989	16.0	40,844	15.3	32,726	16.8
Mining	13,526	62.5	9,342	69.4	6,782	59.9	5,877	58.1
Contract construction	8,838	28.4	14,771	28.5	14,911	22.7	15,674	25.0
Food & kindred products manufacturing	2,785	30.9	3,360	31.1	4,243	25.5	3,047	16.4
Lumber & wood products manufacturing	3,437	67.0	4,714	69.1	6,813	60.9	7,236	65.3
Printing & publishing	1,576	33.9	1,895	33.1	2,709	28.8	2,327	28.5
Chemicals & allied products manufacturing	83	43.3	177	36.7	448	56.6	511	55.1
Primary metals and fabricated metals	4,080	49.8	5,830	57.5	5,219	62.3	5,757	51.2
Machinery manufacturing	373	37.5	430	31.9	738	22.9	616	32.0
All other manufacturing	1,413	20.0	2,109	15.4	3,269	16.5	4,132	29.0
Transportation, communications, & public utilities	14,883	31.1	22,509	28.9	21,013	27.9	19,458	28.5
Wholesale & retail trade	29,315	30.5	41,628	28.8	47,094	26.6	54,525	27.3
Finance, insurance, & real estate	3,530	28.1	5,018	26.8	8,035	23.7	9,546	25.3
Lodging & personal services	6,825	32.1	7,391	33.0	7,886	27.0	9,151	29.5
Business & repair service	3,905	26.5	6,266	26.5	4,737	25.7	5,644	25.0
Entertainment & recreational services	1,472	36.0	1,960	31.6	1,851	27.2	1,866	28.0
Private households	4,335	27.3	3,097	29.6	5,871	24.7	3,108	27.3
Medical, educational, & other	14,158	29.1	19,232	31.6	31,106	28.3	48,899	29.7
Government	8,877	33.8	10,107	22.3	12,590	23.1	14,508	20.7
Industry not reported	2,375	34.3	3,635	30.9	5,111	21.5	—	—

U.S. Census of Population.

Table 11.--Total personal income, Clark Fork study area by subarea, with state comparison, 1970

Item	1929	1940	1950	1959	1970
	----------------------	----------------------	1,000 1958 dollars	----------------------	----------------------
Flathead subarea..............	23,939	36,486	74,893	82,541	117,270
Lower Clark Fork subarea.......	46,053	65,798	172,275	124,241	194,653
Upper Clark Fork subarea.......	135,903	126,670	144,909	150,661	174,175
Total Clark Fork study area....	205,895	228,954	392,077	357,443	486,098
Total state....................	569,405	694,453	1,160,434	1,327,660	1,815,764
Percent study area of state....	36.2	33.0	33.8	26.9	26.8

U.S. Department of Commerce - Regional Economics Information System.

These data have been adjusted to constant 1958 dollars to eliminate purely inflationary advances in the personal income account. Although a 50-year series is presented, the more recent data, last 10 to 20 years, warrants particular attention.

The period 1950-1959 was characterized by a decline in real personal income for the study area as a whole. The decline averaged 1 percent per year for the period. Although both the Flathead and Upper Clark Fork subareas had modest increases in real personal income, an average annual decline of 3.5 percent for the Lower Clark Fork was a dominant force on total real personal income.

The period 1959-1970 witnessed a reversal of the declining trend in the Lower Clark Fork, and all subareas experienced growth in real personal income. Expansion of personal income in the Flathead and Lower Clark Fork subareas was vigorous for the 11-year period. Average annual increase for the two subareas was 3.3 and 4.1 percent, respectively. Increase in the Upper Clark Fork was modest, averaging 1.3 percent annually for the 11-year period. Growth rate for the study area as a whole during the 1959-1970 period averaged 2.9 percent annually, identical to that experienced by the state for the same period.

Per capita personal income (total income divided by total population) is generally considered to be a more meaningful indication of the relative economic well-being of individuals within a region than estimates of total personal income. For the study area as a whole, per capita income in 1970 was $3,025, about 10 percent below the state per capita income. The study area was also considerably below the national 1970 per capita income of $3,921. Figure 4 compares the per capita personal incomes of the economic subarea of the Clark Fork.

Mean family income for the study area in the base period was $9,454. Ten percent of the total number of families had incomes below the poverty threshhold established by the Federal Interagency Committee on Poverty. Mean family income was $8,821, $10,048, and $9,233 for the Flathead, Lower Clark Fork, and Upper Clark Fork subareas, respectively. The Flathead subarea had

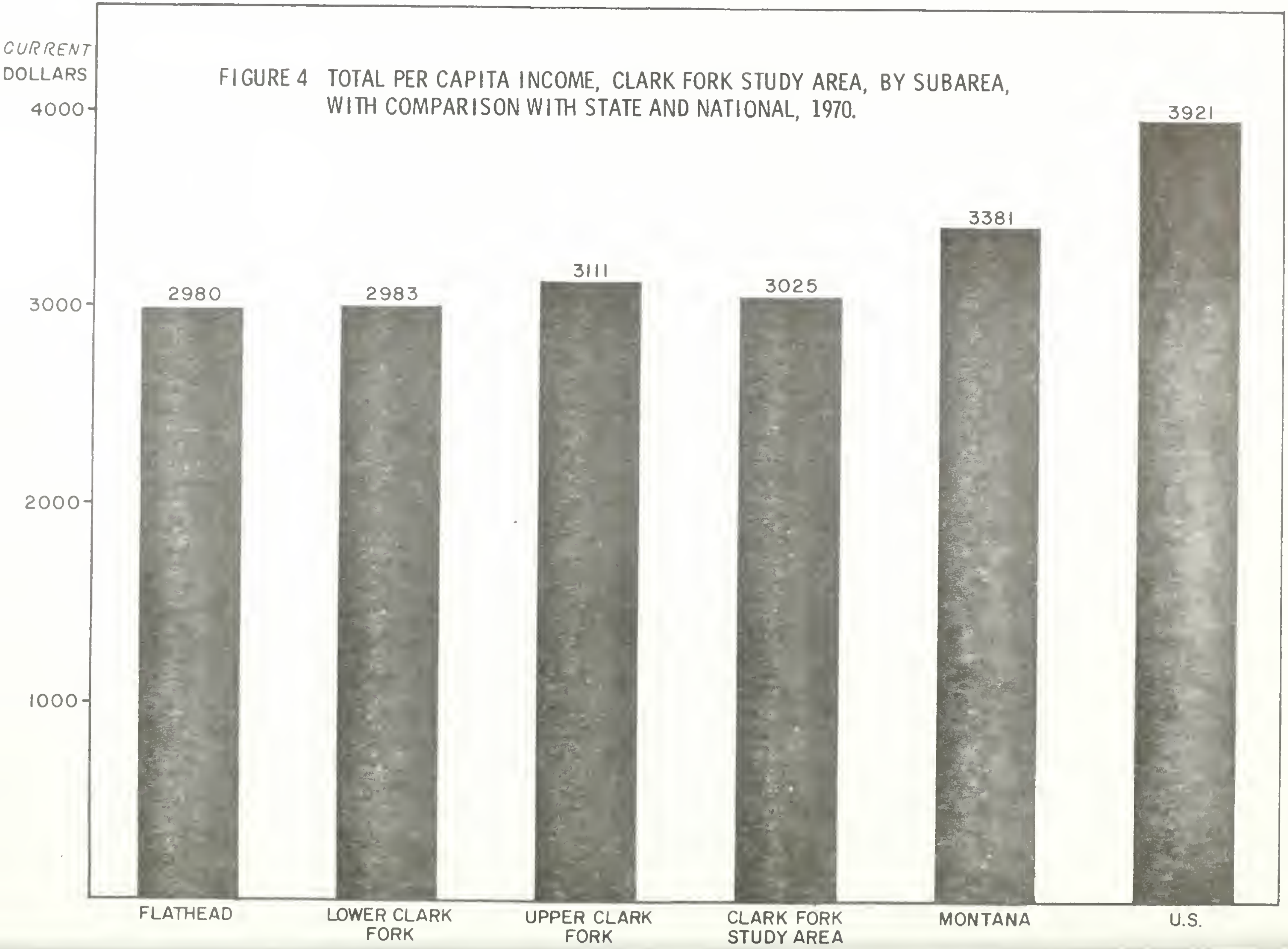


FIGURE 4 TOTAL PER CAPITA INCOME, CLARK FORK STUDY AREA, BY SUBAREA, WITH COMPARISON WITH STATE AND NATIONAL, 1970.

12 percent of all families below the poverty level, while the Upper Clark Fork had 8 percent and the Lower Clark Fork subarea had 10 percent.

The major components of personal income are earnings, property income, and transfer payments, the latter being payments such as unemployment insurance, social security, and general welfare payments. A deduction must be made for social security premiums paid. Earned income is derived from wages, salaries, profits or fees as opposed to income derived from rents, dividends, interest, etc. Roughly, the distinction is one between income derived from labor or entrepreneurship and income derived from invested capital.

Measured in current dollars, personal income in the Clark Fork study area totaled $628 million in 1970 (table 12). Transfer payments constituted about 12 percent of total income. The proportion contributed to total personal income by transfer payments was generally uniform among the subareas of the study area. Wages and salaries comprised nearly 84 percent of total earnings in the study area as a whole. This component did not vary significantly among the subareas except in the Flathead subarea, where wages and salaries totaled 79 percent of total earnings. Proprietors' income comprised a greater proportion of total earnings, 15 percent, in the Flathead than in the Lower and Upper Clark Fork subareas.

In terms of total personal income, wages and salaries are by far the most significant component. They comprise approximately 63 percent of total personal income in the study area. Nationally, wages and salaries have persistently been between 60 and 70 percent of national income. Table 13 facilitates a detailed examination of the economic sectors which pay significant levels of wages and salaries. The data is presented by subarea, and some comparisons are made with state totals.

Wages and salaries from farm and farm-related sources are rather small in the context of the entire economy of the study area. Only in the Lower Clark Fork did they exceed $2 million. Ninty-eight percent of wages and salaries paid by mining firms in the study area accrued to recipients in the Upper Clark Fork subarea. The Clark Fork study area accounted for 63 percent of all wages and salaries paid by mining in the state. The construction industry is a highly

Table 12.--Personal income, by major components, Clark Fork study area by subarea, 1970

Item	Flathead subarea	Lower Clark Fork subarea	Upper Clark Fork subarea	Total Clark Fork study area
	1,000 current dollars			
TOTAL PERSONAL INCOME..........	151,630	251,686	225,208	628,524
Earnings.....................	113,885	191,023	167,655	472,563
Property income..............	24,685	42,915	37,260	104,860
Transfer payments............	19,906	28,290	29,293	77,489
Less Social Security premiums	-6,846	-10,542	-9,000	-26,388
TOTAL EARNINGS................	113,885	191,023	167,655	472,563
Wages and salaries...........	90,319	161,752	143,468	395,539
Other labor income...........	6,501	9,032	7,688	23,221
Proprietors' income..........	17,065	20,239	16,499	53,803

U.S. Department of Commerce - Regional Economics Information System.

Table 13.--Total wages and salaries by sector, Clark Fork study area by subarea, with state comparison, 1970

Item	Flathead subarea	Lower Clark Fork subarea	Upper Clark Fork subarea	Total Clark Fork study area	Percent study area of state	Montana
	1,000 dollars				Percent	1,000 dollars
Farm and farm-related	1,504	2,043	1,605	5,152	12	42,045
Agricultural services	64	239	239	542	24	2,253
Forestry & fisheries	103	381	17	501	69	724
Mining	336	411	35,385	36,132	63	57,500
Contract construction	4,210	11,993	5,697	21,900	22	98,501
General building	1,060	1,963	1,505	4,528	23	19,562
Heavy construction	1,808	6,262	944	9,014	18	48,841
Special trade	1,342	3,768	3,248	8,358	28	30,098
Manufacturing	27,027	34,879	19,192	81,098	46	175,642
Durable goods manufacturing	25,949	25,258	14,606	65,813	58	113,813
Lumber & wood products, except furniture	15,642	24,458	2,099	42,199	70	60,571
Furniture & fixtures	21	0	0	21	4	584
Stone, clay, & glass products	401	457	281	1,139	15	7,400
Primary metals & fabricated metals	8,713	0	11,533	20,246	53	37,986
Machinery, including electrical	317	0	0	317	25	1,260
All other durable goods manufacturing	855	343	693	1,891	37	5,117
Non-durable goods manufacturing	1,078	9,621	4,586	15,285	25	61,829
Food & kindred products	419	2,922	1,017	4,358	15	28,562
Paper & allied products	0	5,156	0	5,156	100	5,156
Printing, publishing, & allied products	604	1,385	1,113	3,102	26	11,944
Chemicals & allied products	0	0	2,456	2,456	74	3,307
Petroleum refining	0	0	0	0	0	11,429
Miscellaneous	55	158	0	213	15	1,431
Transportation, communication, & public utilities	10,985	17,545	11,094	39,624	27	146,827
Transportation, including rail & water	6,789	13,080	8,235	28,104	29	98,081
Communications	233	2,874	1,602	4,709	19	25,126
Electric, gas, & sanitary services	3,963	1,591	1,257	6,811	29	23,620
Wholesale & retail trade	14,522	28,682	23,388	66,592	27	243,934
Wholesale trade	2,891	7,915	8,424	19,230	26	73,574
Retail trade	11,631	20,767	14,964	47,362	28	170,360
Building materials & farm equipment	615	1,387	324	2,326	14	16,903
Retail general merchandise	1,516	2,926	2,561	7,003	31	22,816
Food stores	3,031	2,759	2,735	8,525	30	28,090
Automotive dealers & service stations	2,968	5,967	3,371	12,306	29	42,553
Apparel & accessory stores	355	613	649	1,617	24	6,719
Furniture & home furnishings	497	821	879	2,197	31	7,157
Eating & drinking places	1,858	3,971	3,171	9,000	29	30,919
Miscellaneous retail stores	791	2,323	1,274	4,388	29	15,203
Finance, insurance, & real estate	2,414	5,003	3,944	11,361	24	48,313
Banking, including federal reserve banks	1,584	2,264	1,573	5,421	24	22,147
Credit agencies, except banks	189	698	497	1,384	30	4,586
Insurance carriers, including solicitors	0	249	807	1,056	12	8,751
Insurance agents, brokers, & service	208	875	436	1,519	33	4,662
Real estate	229	683	279	1,191	28	4,288
All other	204	234	352	690	20	3,879

(continued)

Table 13.--Total wages and salaries by sector, Clark Fork study area by subarea, with state comparison, 1970 (continued)

Item	Flathead subarea	Lower Clark Fork subarea	Upper Clark Fork subarea	Total Clark Fork study area	Percent study area of state	Montana
			1,000 dollars		Percent	1,000 dollars
Total services	8,590	18,930	13,943	41,463	26	156,573
Hotels & other lodging places	1,009	1,283	1,184	3,476	27	12,773
Personal services & private households	1,161	2,068	1,619	4,848	26	18,894
Personal services	562	1,224	892	2,678	28	9,478
Private households	599	844	727	2,170	23	9,416
Misc. business, auto repair, & misc. repair	423	2,756	1,189	4,368	25	17,704
Miscellaneous business services	201	1,167	786	2,154	24	9,045
Auto repair, auto services, & garages	137	1,035	170	1,342	25	5,298
Miscellaneous repair service	85	554	233	872	26	3,361
Amusement & recreation, including motion pictures	202	470	489	1,161	27	4,286
Motion pictures	69	152	180	401	30	1,336
All other	133	318	309	760	26	2,950
Professional, social, & related services	5,795	12,353	9,462	27,610	27	102,916
Hospitals	2,359	4,999	4,036	11,394	30	38,139
Other medical & health services	937	3,358	1,160	5,455	34	15,817
Legal services	159	327	382	868	31	2,800
Private educational services	658	909	1,603	3,170	28	11,139
All other professional & social	1,682	2,760	2,281	6,723	19	35,021
Government	20,731	42,266	29,220	92,217	24	380,863
Federal civilian	7,380	17,947	4,627	29,954	27	109,066
Federal military	843	697	554	2,094	4	49,622
State & local government	12,508	23,622	24,039	60,169	27	222,175
State government	3,254	11,883	14,788	29,925	32	92,085
Local government	9,254	11,739	9,251	30,244	23	130,090
TOTAL WAGES & SALARY	90,319	161,752	143,468	395,539		1,350,198

Montana State Department of Employment Security and cooperating firms.

volatile sector characterized by severe fluctuations in activity. In 1970 about 55 percent of payrolls in the study area from contract construction were paid in the Lower Clark Fork subarea. The area of concentration in construction could well shift elsewhere in the study area another year.

In the manufacturing sector lumber and wood products, primary metals, and paper and allied products are among the most significant in terms of wages and salaries paid. Payrolls of manufacturing firms accounted for 21 percent of total wages and salaries for the study area. Transportation, communications, and public utilities paid 10 percent of total; wholesale and retail trade only slightly more, 17 percent. Services also paid approximately 10 percent of the total.

Government paid $92 million in wages and salaries in the study area as a whole in 1970. This amounted to 23 percent of total wages and salaries. State and local payrolls accounted for 65 percent of the total for government in the study area.

Characteristics of Agriculture

Agriculture is one of the study area's leading industries. Livestock and livestock products are the principal source of agricultural income, but field crops are important, particularly in the Flathead and Bitterroot Valleys. Pasture and range lands are extensive throughout the study area. Some of the major characteristics of agriculture are examined in greater detail in the following discussion.

Land Use

Table 14 shows total land by major land use for the study area, by county and subarea. Cultivated cropland comprises about 4 percent of the total land area. Non-cultivated pasture and range account for approximately 13 percent of total land. About one-fourth of the land area is private forests, and 57 percent is federal non-cropland.

The Flathead subarea has a slightly larger proportion of its total land area in cropland than the Upper and Lower Clark Fork, but the difference is not

Table 14.--Total land, by major land use, Clark Fork study area, by subarea, current normal

Item	Total land area 1/	Federal non-cropland		Urban and built-up	Small water area 2/	Total
		Nat'l forest	Other			
	Acres					
Flathead....................	3,289,600	1,783,920	627,729	17,349	6,524	854,078
Lake........................	960,000	153,704	17,419	19,115	5,000	764,762
FLATHEAD SUBAREA...........	4,249,600	1,937,624	645,148	36,464	11,524	1,618,840
Missoula....................	1,672,320	688,686	26,027	18,000	4,989	934,618
Mineral.....................	782,720	646,890	1,376	9,240	2,321	122,893
Sanders.....................	1,791,360	908,921	13,767	14,232	6,541	847,899
Ravalli.....................	1,525,760	1,109,580	1,941	7,785	5,600	400,854
LOWER CLARK FORK SUBAREA...	5,772,160	3,354,077	43,111	49,257	19,451	2,306,264
Deer Lodge..................	472,320	153,033	5,319	19,951	500	293,517
Granite.....................	1,109,120	660,615	47,837	6,203	780	393,685
Powell......................	1,495,680	634,952	78,961	14,114	8,000	759,653
Silver Bow..................	458,240	193,014	45,190	13,316	411	206,309
UPPER CLARK FORK SUBAREA...	3,535,360	1,641,614	177,307	53,584	9,691	1,653,164
CLARK FORK STUDY AREA.......	13,557,120	6,933,315	865,566	139,305	40,666	5,578,268

(See end of table for footnotes)

(continued)

Table 14.--Total land, by major land use, Clark Fork study area, by subarea, current normal (continued)

	Agricultural[3]							
	Cropland							
Item	Total	Harvested	Not harvested [4]	Double use [5]	Pasture	Range	Forest	Other
	Acres							
Flathead	119,096	104,229	14,867	0	22,354	49,320	654,202	9,106
Lake	115,836	104,836	11,000	0	80,891	180,472	375,563	12,000
FLATHEAD SUBAREA	234,932	209,065	25,867	0	103,245	229,792	1,029,765	21,106
Missoula	43,223	38,670	4,553	0	14,670	74,078	790,403	12,244
Mineral	4,339	4,339	0	0	1,085	689	115,445	1,335
Sanders	46,639	42,997	3,642	0	30,516	250,796	510,255	9,693
Ravalli	68,193	66,086	2,107	0	64,500	95,333	161,947	10,881
LOWER CLARK FORK SUBAREA	162,394	152,092	10,302	0	110,771	420,896	1,578,050	34,153
Deer Lodge	17,520	18,209	1,298	-1,987	7,694	146,851	119,547	1,905
Granite	38,263	38,263	0	0	12,433	181,846	159,411	1,732
Powell	71,862	78,614	130	-6,882	25,762	361,697	293,886	6,446
Silver Bow	10,780	10,750	30	0	2,000	143,071	48,990	1,468
UPPER CLARK FORK SUBAREA	138,425	145,836	1,458	-8,869	47,889	833,465	621,834	11,551
CLARK FORK STUDY AREA	535,751	506,993	37,627	-8,869	261,905	1,484,153	3,229,649	66,810

[1] Does not include reservoirs over 40 acres in size.

[2] Water areas from 2 to 40 acres in size.

[3] Includes private, state, and Indian-owned lands, including tribal lands.

[4] Includes crop failure, conservation use, temporarily idle cropland, open cropland formerly cropped, and non-pasture cropland grazed.

[5] Difference between crops harvested, as reported in Montana agriculture statistics, and cropland reported in Montana 1967 Conservation Needs Inventory.

Clark Fork Type IV Soil Resource Group Survey, and Montana 1967 Conservation Needs Inventory.

large. Five percent of the total land area of the Flathead subarea is cultivated cropland, compared to 3 percent in the Lower Clark Fork and 4 percent in the Upper Clark Fork.

A land resource inventory recently conducted in the Clark Fork study area revealed only rather small changes in major land uses since the Soil and Water Conservation needs inventory was conducted in 1967. Total cultivated cropland increased about 11,000 acres in the Clark Fork Study Area. There have been, however, some significant shifts of land use within the cpopland category. Since the 1967 conservation needs inventory was conducted, about 13,300 additional acres came under irrigation. These changes in irrigated acres occurred primarily within the Flathead subarea, with 9,800 additional irrigated acres, with the remaining increase occurring in the Lower Clark Fork subarea. Table 15 shows the current normal irrigated land, by major land use, and table 16 presents data for non-irrigated cropland.

Number, Size, and Type of Farms

Farm numbers have declined more rapidly in the Clark Fork study area than in the state as a whole. Farm numbers declined 27 percent in the study area between 1959 and 1969. The rate of decline for the state was 25 percent for the same time period. Farm numbers have declined more rapidly in the Lower Clark Fork and Flathead subareas than in the Upper Clark Fork (table 17). The number of farms in the Clark Fork study area was 3,930 in 1969. Of this total, 1,837, or 47 percent, were in the Flathead subarea; 1,609, or 41 percent, in the Lower Clark Fork; and 484, or 12 percent, in the Upper Clark Fork.

Attendant to the trend in declining farm numbers is an increase in the average size of farms and ranches. In the decade 1959-1969, the average farm size for the study area has increased 32 percent. The trend to larger size farms is more rapid within the study area than for the state as a whole. The increase for the state was only 14 percent. Within the subareas of the study area, farm size has increased more rapidly in the Lower Clark Fork in the 1959-1969 time period, with a 36 percent increase. The Flathead and Upper Clark Fork subareas had increases in average farm size of 30 and 17 percent, respectively. Farms are smaller and more intensively cropped in the Flathead subarea. Farms in the

Table 15.--Total irrigated land, by major land use, Clark Fork study area, by subarea, current normal[1/]

Item	Field crops			Rotation hay & pasture	Hay land	Total tillage rotation	Orchards	Total irrigated cropland	Irrigated permanent pasture	Irrigated range	Total irrigated land
	All row crops	Close grown crops	Total field crops								
	Acres										
Flathead	665	5,233	5,898	10,310	5,816	22,024	0	22,024	3,636	0	25,660
Lake	2,400	5,367	7,767	3,600	42,733	54,100	700	54,800	51,077	0	105,877
FLATHEAD SUBAREA	3,065	10,600	13,665	13,910	48,549	76,124	700	76,824	54,713	0	131,537
Missoula	233	3,366	3,599	2,914	16,220	22,733	0	22,733	8,350	0	31,083
Mineral	0	300	300	0	1,300	1,600	0	1,600	37	0	1,637
Sanders	0	1,234	1,234	0	15,233	16,467	30	16,497	7,551	0	24,048
Ravalli	1,748	8,094	9,842	4,900	36,461	51,203	800	52,003	62,000	0	114,003
LOWER CLARK FORK	1,981	12,994	14,975	7,814	69,214	92,003	830	92,833	77,938	0	170,771
Deer Lodge	793	1,683	2,476	500	14,433	17,409	0	17,409	7,694	0	25,103
Granite	0	1,533	1,533	0	32,967	34,500	0	34,500	7,186	0	41,686
Powell	653	3,620	4,273	3,820	54,880	62,973	0	62,973	11,460	0	74,433
Silver Bow	0	400	400	500	5,900	6,800	0	6,800	0	2,300	9,100
UPPER CLARK FORK	1,446	7,236	8,682	4,820	108,180	121,682	0	121,682	26,340	2,300	150,322
CLARK FORK SUBAREA	6,492	30,830	37,322	26,544	225,943	289,809	1,530	291,339	158,991	2,300	452,630

[1/] Does not include crop failure or non-pasture cropland grazed.

Clark Fork Type IV Soil Resource Group Survey.

Table 16.--Total non-irrigated cropland, by major land use, Clark Fork study area, by subarea, current normal[1/]

Item	Field crops				Rotation hay & pasture	Hay land	Conservation use only	Temporarily idle cropland	Total tillage rotation	Orchards & vineyards	Open land formerly cropped	Total non-irrig. cropland
	Row crops	Close grown crops	Summer fallow	Total field crops								
	Acres											
Flathead	110	39,406	16,690	56,206	11,932	14,067	597	1,217	84,019	0	1,990	86,009
Lake	0	17,434	11,344	28,778	0	20,900	645	2,076	52,399	0	1,000	~~53,749~~ 53,3[illegible]
FLATHEAD SUBAREA	110	56,840	28,034	84,984	11,932	34,967	1,242	3,293	136,418	350	2,990	~~139,758~~ 139,4[illegible]
Missoula	0	6,700	2,737	9,437	100	6,633	0	615	16,785	0	459	17,244
Mineral	0	877	385	1,262	0	1,567	0	0	2,829	0	0	2,829
Sanders	0	6,733	4,500	11,233	0	15,267	1,407	726	28,633	0	0	28,633
Ravalli	0	6,866	6,500	13,366	0	1,367	0	2,024	16,757	0	83	16,840
LOWER CLARK FORK	0	21,176	14,122	35,298	100	24,834	1,407	3,365	65,004	0	542	65,546
Deer Lodge	0	400	400	800	0	0	0	1,098	1,898	0	200	2,098
Granite	0	1,300	1,200	2,500	0	1,533	0	0	4,033	0	0	4,033
Powell	0	4,575	4,200	8,775	0	6,866	130	0	15,771	0	0	15,771
Silver Bow	0	0	0	0	0	1,700	0	30	1,730	0	0	1,730
UPPER CLARK FORK	0	6,275	5,800	12,075	0	10,099	130	1,128	23,432	0	200	23,632
CLARK FORK STUDY AREA	110	84,291	47,956	132,357	12,032	69,900	2,779	7,786	224,854	350	3,732	228,936 [illegible]

1/ Does not include crop failure or non-pasture cropland grazed.

Clark Fork Type IV Soil Resource Group Survey.

Table 17.--Number of farms and average size of farm, Clark Fork study area, by county and subarea, 1959-1969

	1959		1964		1969	
	Farms	Average size	Farms	Average size	Farms	Average size
	Number	Acres	Number	Acres	Number	Acres
Flathead	1,184	428	1,088	433	825	477
Lake	1,363	384	1,240	409	1,012	563
FLATHEAD SUBAREA	2,547	405	2,328	420	1,837	525
Missoula	509	733	431	903	327	1,038
Mineral	59	509	75	457	46	579
Sanders	493	830	449	1,028	376	1,331
Ravalli	1,178	321	1,031	357	860	346
LOWER CLARK FORK SUBAREA	2,239	532	1,986	631	1,609	724
Deer Lodge	77	2,203	75	2,724	67	3,825
Granite	155	2,310	145	2,415	140	2,816
Powell	215	3,741	200	3,772	169	4,154
Silver Bow	124	1,074	137	935	108	919
UPPER CLARK FORK SUBAREA	571	2,566	557	2,580	484	2,997
TOTAL STUDY AREA	5,357	688	4,871	753	3,930	911
STATE	28,959	2,213	27,020	2,436	24,953	2,521

U.S. Census of Agriculture.

Lower Clark Fork are considerably larger than those in the Flathead, and the average size of farms within the Upper Clark Fork are more than four-fold as large.

About one-fourth of the farms in the Flathead and in the Lower Clark Fork are under 50 acres in size. Only 14 percent of the farms in the Upper Clark Fork are in this category (table 18). About half of the farms in the Upper Clark Fork are 1,000 acres or more in size. Only 8 percent in the Flathead and 13 percent in the Lower Clark Fork are 1,000 acres or more in size.

Fifty-eight percent of the total number of farms in the study area had at least some irrigated land in 1969. There was some variation among subregions in this respect, but it was not great. Sixty-nine percent of the farms in the Upper Clark Fork had at least some irrigated land - 66 percent in the Lower Clark Fork and 47 percent in the Flathead.

Data on type of farm has been reported for farms with sales over $2,500. The type of farm classification is based upon the major source of farm income. To be classified as a particular type, at least 50 percent of the total value of the farm's total sales must have resulted from the sale of that commodity. The most significant types of farms and ranch operations in the study area center around livestock and livestock products. Seventy percent of all farms with sales greater than $2,500 are classified as livestock farms and ranches other than dairy and poultry. Cash grain farms have some importance in the Flathead subarea (table 19). Vegetable and fruit farms comprise only a small proportion of the total in the study area. However, all fruit farms within the state are found in the Clark Fork study area.

Of the 3,930 farms in the study area in 1969, only 235, or 6 percent of the total, had annual sales of $40,000 or more (table 20). Both the Flathead and Lower Clark Fork subareas had less than 5 percent of farms in economic class I.

Nearly one-fourth of the farms in the study area are part-time. This approximate part-time ratio applies in both the Flathead and Lower Clark Fork subareas. In the Upper Clark Fork, part-time farms are not as prevalent. Part-time farms

Table 18.--Number of farms, by size of farms, Clark Fork study area by county and subarea, 1969

	1-9 acres	10-49 acres	50-99 acres	100-179 acres	180-259 acres	260-499 acres	500-999 acres	1,000-1,999 acres	2,000 & over acres	All farms
	Number of farms									
Flathead	44	140	127	145	93	130	86	33	27	825
Lake	85	163	175	156	105	162	84	52	30	1,012
FLATHEAD SUBAREA	129	303	302	301	198	292	170	85	57	1,837
Missoula	32	57	30	47	18	42	41	30	30	327
Mineral	1	8	1	7	3	11	8	5	2	46
Sanders	4	22	24	39	44	93	64	43	43	376
Ravalli	49	230	159	141	61	87	74	33	26	860
LOWER CLARK FORK SUBAREA	86	317	214	234	126	233	187	111	101	1,609
Deer Lodge	2	10	3	13	1	10	5	7	16	67
Granite	8	10	5	5	7	11	14	30	50	140
Powell	11	10	4	4	0	12	19	33	76	169
Silver Bow	8	10	4	12	11	19	18	10	16	108
UPPER CLARK FORK SUBAREA	29	40	16	34	19	52	56	80	158	484
TOTAL STUDY AREA	244	660	532	569	343	577	413	276	316	3,930

Table 19.--Commercial farms, by type of farm, Clark Fork study area, by county and subarea, 1969

	Total farms	Commercial farms[1]	Cash grain farms	Other field crop farms	Vegetable farms	Fruit farms	Poultry farms	Dairy farms	Livestock farms other than dairy & poultry	Livestock ranches	General farms	Misc. farms
	Number											
Flathead	825	465	100	4	1	3	8	29	202	29	56	33
Lake	1,012	688	16	23	0	28	2	73	439	56	42	9
FLATHEAD SUBAREA	1,837	1,153	116	27	1	31	10	102	641	85	98	42
Missoula	327	171	7	1	2	0	1	4	90	28	23	15
Mineral	46	23	0	0	0	0	0	0	11	4	4	4
Sanders	376	255	6	1	0	0	0	3	143	63	23	16
Ravalli	860	538	9	12	0	5	5	55	308	78	40	26
LOWER CLARK FORK SUBAREA	1,609	987	22	14	2	5	6	62	552	173	90	61
Deer Lodge	67	45	0	4	0	0	2	0	24	11	1	3
Granite	140	121	0	0	0	0	0	0	63	51	5	2
Powell	169	151	1	2	0	0	0	0	80	44	19	5
Silver Bow	108	60	0	0	0	0	2	1	22	25	5	5
UPPER CLARK FORK SUBAREA	484	377	1	6	0	0	4	1	189	131	30	15
TOTAL STUDY AREA	3,930	2,517	139	47	3	36	20	165	1,382	389	218	118
MONTANA	24,953	20,603	6,815	519	7	36	68	429	7,139	4,243	1,097	250

[1] Sales of $2,500 and over.

U.S. Census of Agriculture.

Table 20.--Distribution of farms by economic class, Clark Fork study area, by subarea with comparison, 1969

	Value of farm products sold per farm	Flathead subarea		Lower Clark Fork subarea		Upper Clark Fork aubarea		Total Clark Fork study area		Montana	
	------- Dollars ------	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Class I...........	40,000 & over	88	4.8	72	4.5	75	15.5	235	6.0	3,095	12.4
Class II..........	20,000 - 39,999	139	7.6	158	9.8	86	17.8	383	9.7	5,304	21.3
Class III.........	10,000 - 19,999	314	17.1	225	14.0	91	18.8	630	16.0	5,762	23.1
Class IV..........	5,000 - 9,999	299	16.3	264	16.4	63	13.0	626	15.9	3,799	15.2
Class V...........	2,500 - 4,999	313	17.0	268	16.7	62	12.8	643	16.4	2,645	10.6
Class VI..........	50 - 2,499	98	5.3	103	6.4	22	4.5	223	5.7	851	3.4
Part-time.........	50 - 2,499	442	24.1	401	24.9	61	12.6	904	23.0	2,662	10.7
Part retirement....	50 - 2,499	141	7.7	114	7.1	22	4.5	277	7.0	742	3.0
Abnormal..........		3	.2	4	.2	2	.5	9	.3	93	.3
TOTAL FARMS.....		1,837	100.0	1,609	100.0	484	100.0	3,930	100.0	24,953	100.0

U.S. Census of Agriculture.

are those having sales of $50 to $2,499, and a farm operator who is under 65 years of age and worked off the farm 100 days or more. Part-retirement farms have $50 to $2,499 of farm sales and a farm operator who is 65 years old or older Abnormal farms include institutional farms, experimental and research farms, and Indian reservations.

Table 21 presents data on off-farm employment by farm operators in the study area. These data indicate some off-farm employment exists among operators of Class V or above farms. Nearly half of the total number of farms in the Lower Clark Fork had operators who worked off their farm 100 days or more, and 38 percent had 200 or more days of off-farm employment. The other two subareas had significant levels of off-farm employment, although somewhat below that of the Lower Clark Fork. These data reveal significant implications for resource planners working in the Clark Fork study area. This pattern of farm operation couple with other employment doubtlessly affects quality of management, and probably influences the overall climate for resource conservation measures and interest in possible opportunities for further resource development.

Tenure Status of Farm Operators

Tenancy on Montana farms and ranches is quite negligible. Operators who are tenants are less common within the study area than in the state generally (table 22). The percentage of farm operators who are tenants on the land they farm is slightly higher in the Upper Clark Fork subarea, but nowhere in the study area does the ratio exceed 9 percent. Tenants in general are the younger farmers. The percentage of operators who are tenants declines rapidly as age of operator increases. Conversely, percentage who are full owners increases rapidly as age of operator increases. The proportion who are part owners increases by age of operator, until an average age of between 35 and 44 is attained, and then declines as average age increases beyond that point.

Farm Investment

In recent years real estate values in Montana have either kept pace with, or exceeded, the overall national upward trends. Value of land and buildings in the Clark Fork study area exceeds the state average when viewed from a per-acre-in-farms perspective, but is considerably below the state average on a per-farm

Table 21.--Off-farm employment by farm operators, Clark Fork study area by subarea, 1969

	Operators employed off-farm 100 or more days		Operators employed off-farm 200 or more days	
	Number	Percent of all farms	Number	Percent of all farms
Flathead	416	50.4	313	37.9
Lake	395	39.0	308	30.4
FLATHEAD SUBAREA	811	44.1	621	33.8
Missoula	158	48.3	124	37.9
Mineral	28	60.9	26	56.5
Sanders	195	51.9	158	42.0
Ravalli	391	45.5	304	35.3
LOWER CLARK FORK SUBAREA	772	48.0	612	38.0
Deer Lodge	33	49.3	32	47.8
Granite	28	20.0	18	12.9
Powell	42	24.9	31	18.3
Silver Bow	56	51.9	51	47.2
UPPER CLARK FORK SUBAREA	159	32.9	132	27.3
TOTAL STUDY AREA	1,742	44.3	1,365	34.7

U.S. Census of Agriculture.

Table 22.--Tenure status of farm operators, Clark Fork study area by subarea, 1964 and 1969

	All operators		Full owners		Part owners		Tenants	
	1964	1969	1964	1969	1964	1969	1964	1969
	Percent							
Flathead subarea............	100	100	68	66	26	28	6	6
Lower Clark Fork subarea.....	100	100	67	69	25	26	8	6
Upper Clark Fork subarea.....	100	100	51	48	40	43	9	9
Clark Fork study area........	100	100	65	65	28	28	7	7
Montana.....................	100	100	43	43	45	45	12	12

U.S. Census of Agriculture.

basis. Data in table 23 highlight some of the characteristics of farm values in the study area, and in Montana generally.

Average figures for per-farm and per-acre include values for both irrigated and non-irrigated lands. In recent years increases in the value of grazing land have outpaced the increase in value of irrigated cultivated land. In Montana, values of grazing land increased 29 percent between 1964 and 1969, and then increased another 59 percent between 1969 and 1973. Increases for irrigated land for the same period were considerably less.

Upward pressures in real estate values appear, in many instances, to be closely correlated with earnings from farm and ranch production. Markets are highly localized in nature, however, and in some areas non-farm demand, such as subdivisions for summer homes, etc., have a greater impact on farm real estate values than does present or potential agricultural production.

Sales of Farm Products

Total farm sales for the study area in 1969 were valued at $47.7 million. About 80 percent of the value of recent farm sales has been from livestock and livestock products. Forty-two percent of the study area's total farm sales were from the Flathead subarea, 35 percent from the Lower Clark Fork, and 23 percent from the Upper Clark Fork (table 24).

About 10 percent of the value of livestock and livestock products sold was dairy products, and 62 percent of dairy sales were in the Flathead subarea. These dairy sales totaled $2.4 million in the Flathead, $1.4 million in the Lower Clark Fork, and only $19,000 in the Upper Clark Fork.

Sales of forest products from private land totaled more than a quarter million dollars in the study area in 1969. Reported forest products sales were $294,000 in the Flathead, $272,000 in the Lower Clark Fork, and $255,000 in the Upper Clark Fork.

Livestock Numbers

Trends in the number of livestock in the study area are presented in figure 5. The overall trend in the study area generally follows the national trend of

Table 23.--Value of land and buildings in farms, Clark Fork study area by county and subarea, 1964 and 1969

	1964			1969		
	Total	Average per farm	Average per acre in farms	Total	Average per farm	Average per acre in farms
	1,000 current dollars	----------- Current dollars -----------		1,000 current dollars	----------- Current dollars -----------	
Flathead..................	47,446	43,609	102.70	69,245	83,933	175.79
Lake......................	54,215	43,722	106.00	67,675	66,872	118.78
FLATHEAD SUBAREA.........	101,661	43,668	103.90	136,920	74,534	142.00
Missoula..................	36,780	85,336	92.29	40,588	124,122	119.55
Mineral...................	2,992	39,898	75.40	2,813	61,154	105.68
Sanders...................	22,646	50,437	49.53	33,927	90,231	67.79
Ravalli...................	47,527	46,098	124.48	61,733	71,782	207.41
LOWER CLARK FORK SUBAREA.	109,945	55,360	87.69	139,061	86,426	119.45
Deer Lodge................	11,403	152,043	55.11	10,856	162,030	42.35
Granite...................	17,562	121,116	49.38	29,908	213,631	75.86
Powell....................	27,921	139,606	36.61	53,726	317,904	76.52
Silver Bow................	7,750	56,570	59.42	7,282	67,426	73.38
UPPER CLARK FORK SUBAREA.	64,636	116,043	44.98	101,772	210,272	70.10
TOTAL AREA..............	276,242	56,712	75.31	377,753	96,120	105.53
STATE....................	2,790,382	103,271	42.30	3,748,289	150,213	59.57
AREA AS PERCENT OF STATE.	9.9	54.9	178.0	10.1	64.0	177.2

U.S. Census of Agriculture.

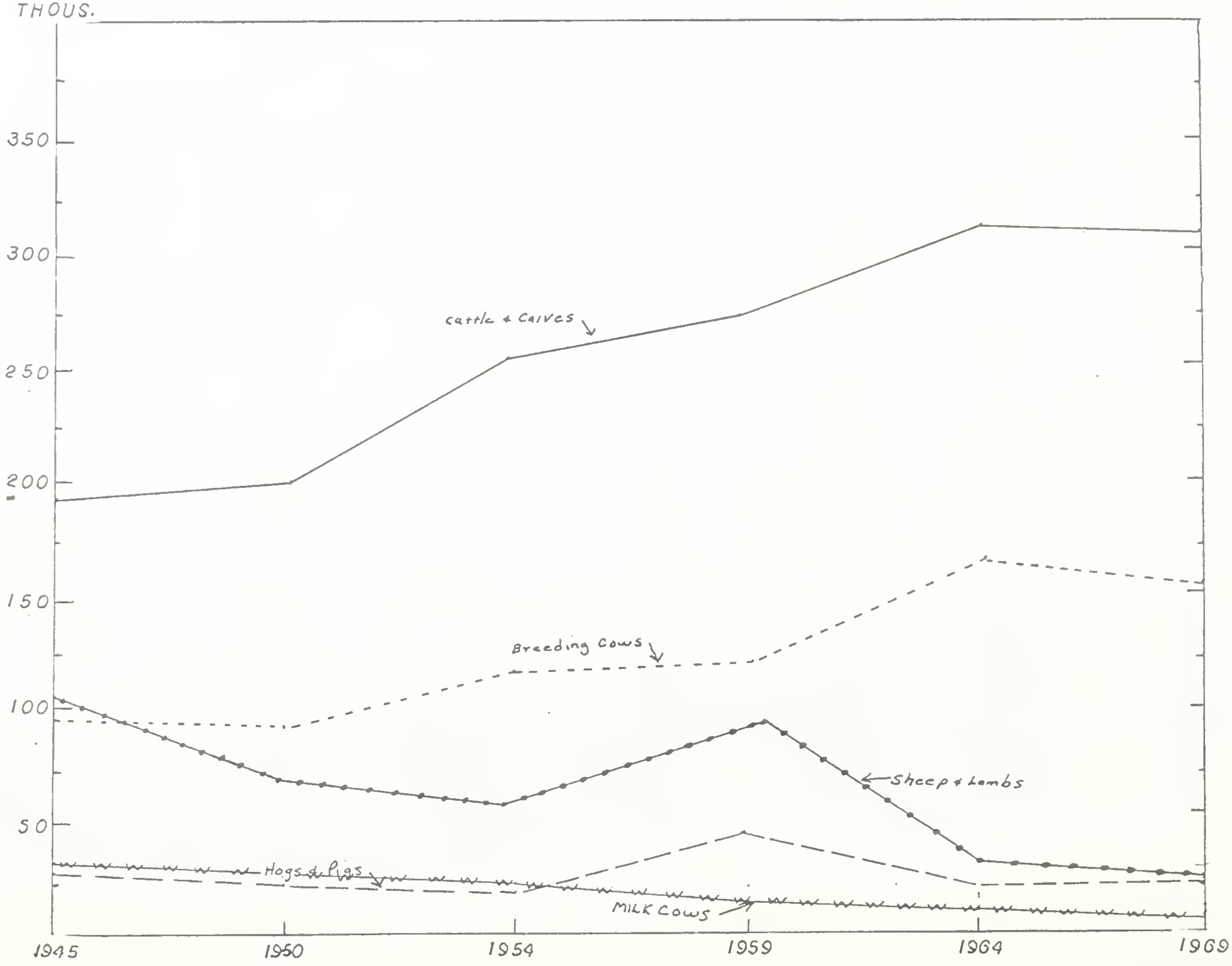
Table 24.--Value of farm products sold, Clark Fork study area by source, county, and subarea, 1964 and 1969

	1964			1969		
	All farm products	Livestock & livestock products	Crops & other 1/	All farm products	Livestock & livestock products	Crops & other 1/
	1,000 current dollars					
Flathead	6,025	3,353	2,672	8,734	6,289	2,445
Lake	8,684	6,015	2,669	11,260	8,628	2,632
FLATHEAD SUBAREA	14,709	9,368	5,341	19,994	14,917	5,077
Missoula	2,749	1,841	908	3,146	2,481	665
Mineral	287	229	58	223	141	82
Sanders	2,174	1,777	397	3,466	2,822	644
Ravalli	7,349	5,643	1,706	9,729	8,625	1,104
LOWER CLARK FORK SUBAREA	12,559	9,490	3,069	16,564	14,069	2,495
Deer Lodge	1,623	775	848	1,857	1,391	466
Granite	2,306	2,115	191	3,352	3,082	270
Powell	4,016	3,159	857	5,180	4,210	970
Silver Bow	669	559	110	803	707	96
UPPER CLARK FORK SUBAREA	8,614	6,608	2,006	11,192	9,390	1,802
TOTAL STUDY AREA	35,882	25,466	10,416	47,750	38,376	9,374
STATE	389,655	216,878	172,777	575,962	384,878	191,084
AREA AS PERCENT OF STATE	9.2	11.7	6.0	8.3	10.0	4.9

1/ A residual value. Census did not report this value, in some instances, because of disclosure laws.

U.S. Census of Agriculture.

FIGURE 5 LIVESTOCK INVENTORIES, CLARK FORK STUDY AREA, 1945-1969



increasing numbers of beef cows and declining numbers of sheep and lambs. Numbers of cows kept for milking declined, but at no time since 1945 has dairying been really significant in the study area.

Nationally, sheep numbers have declined at an average of 4 percent annually from 1960 to 1970. Factors which have contributed to decline in number of sheep and lambs in the study area are generally the same forces common throughout the West. They are: scarcity of experienced labor, high costs of production in the sheep industry, rising predator population, reductions in use of public lands for grazing and, perhaps most important, a general lack of enthusiasm among younger producers for sheep production. There are indications, however, that the downward trend is leveling off, as the decline was rather small between 1964 and 1969.

Since 1969 the increase in beef cattle inventory has continued and accelerated. The national cattle inventory rose 2 million head per year in 1969 and 1970, 3 million in 1971, and 4 million in 1972, and the Economic Research Service is estimating that the increase in 1973 far exceeded that of the previous year. Comparable data are not available for the study area for more recent years, but there are indications cattle numbers in the Clark Fork study area are increasing in response to very favorable prices received by farmers.

During 1971, a total of 270,000 cattle and calves were placed on feed in Montana. As of January 1, 1972, there were 6,400 head of cattle on feed within the Clark Fork study area. About 90 percent of that number were in Flathead, Powell, and Ravalli Counties.

Crop Production

Small grains and hay crops are predominant in the study area. Acreage of corn for silage is small, but has been increasing and yields have been fair. Barley crops are most prevalent among the small grains (table 25). Some malting varieties are grown, but most are feeding varieties. Irrigated wheat is mostly spring wheat (65 percent), but 84 percent of total dryland wheat is winter wheat varieties.

Some Irish potatoes are grown. Seed potatoes provide a good cash crop for many producers. The future for sugar beets is uncertain in the study area.

Table 25.--Crop acreage and production, Clark Fork study area by subarea, current normal

Item	Prod. unit	Flathead subarea Acres	Flathead subarea Production	Lower Clark Fork subarea Acres	Lower Clark Fork subarea Production	Upper Clark Fork subarea Acres	Upper Clark Fork subarea Production	Clark Fork study area Acres	Clark Fork study area Production
Winter wheat, total	Bu.	27,733	1,154,500	12,400	379,800	1,033	25,300	41,466	1,559,600
Irrigated	Bu.	1,833	95,300	834	47,800	0	0	2,667	143,100
Non-irrigated	Bu.	25,900	1,059,200	11,566	332,000	1,033	25,300	38,499	1,416,500
Spring wheat, total	Bu.	6,234	193,900	3,651	107,800	2,766	104,200	12,651	405,900
Irrigated	Bu.	2,000	79,700	1,567	59,900	1,866	83,900	5,433	223,500
Non-irrigated	Bu.	4,234	114,200	2,084	47,900	900	20,300	7,218	182,400
Oats for grain, total	Bu.	4,399	236,600	2,883	140,500	2,251	111,100	9,533	488,200
Irrigated	Bu.	1,466	92,900	1,400	82,800	1,717	90,800	4,583	266,500
Non-irrigated	Bu.	2,933	143,700	1,483	57,700	534	20,300	4,950	221,700
Barley for grain, total	Bu.	26,700	1,321,200	12,834	655,500	6,867	272,030	46,401	2,248,730
Irrigated	Bu.	5,100	306,700	7,700	459,700	3,434	160,300	16,234	926,700
Non-irrigated	Bu.	21,600	1,014,500	5,134	195,800	3,433	111,730	30,167	1,322,030
Corn for silage, total	Ton	434	6,600	666	11,641	0	0	1,100	18,241
Irrigated	Ton	434	6,600	666	11,641	0	0	1,100	18,241
Non-irrigated	Ton	0	0	0	0	0	0	0	0
Irish potatoes, irrigated	Cwt	2,632	620,200	615	127,100	1,446	264,500	4,693	1,011,800
Hay, all	Ton	107,999	208,855	103,866	238,867	123,100	225,126	334,965	672,848
Irrigated	Ton	59,266	135,171	77,932	203,569	113,000	212,166	250,198	550,906
Non-irrigated	Ton	48,733	73,684	25,934	35,298	10,100	12,960	84,767	121,942
Alfalfa, all	Ton	66,099	142,716	57,066	152,693	35,766	89,759	158,931	385,168
Irrigated	Ton	34,866	92,918	41,200	129,752	32,933	85,625	108,999	308,295
Non-irrigated	Ton	31,233	49,798	15,866	22,941	2,833	4,134	49,932	76,873
Other hay, total	Ton	41,900	66,139	46,800	86,174	87,334	135,366	176,034	287,679
Irrigated	Ton	24,400	42,253	36,732	73,817	80,067	126,540	141,199	242,610
Non-irrigated	Ton	17,500	23,886	10,068	12,357	7,267	8,826	34,835	45,069
Sugar beets, irrigated	Ton	0	0	700	12,600	0	0	700	12,600
Apples, total	Lbs.	140	255,000	453	438,600	0	0	593	693,600
Irrigated	Lbs.	90	180,000	453	438,600	0	0	543	618,600
Non-irrigated	Lbs.	50	75,000	0	0	0	0	50	75,000
Sweet cherries, total	Lbs.	910	6,144,000	372	2,976,000	0	0	1,282	9,120,000
Irrigated	Lbs.	610	4,944,000	372	2,976,000	0	0	982	7,920,000
Non-irrigated	Lbs.	300	1,200,000	0	0	0	0	300	1,200,000
Pears, irrigated	Lbs.	0	0	5	6,000	0	0	5	6,000
Cropland pasture, total	AUM	4,140	17,100	193	1,200	0	0	4,333	18,300
Irrigated	AUM	3,800	16,700	193	1,200	0	0	3,993	17,900
Non-irrigated	AUM	340	400	0	0	0	0	340	400
Permanent pasture, total	AUM	103,245	252,900	110,771	346,492	47,745	120,114	261,761	719,506
Irrigated	AUM	54,713	210,400	77,938	319,800	26,340	97,100	158,991	627,300
Non-irrigated	AUM	48,532	42,500	32,833	26,692	21,405	23,014	102,770	92,206
Range, total	AUM	224,392	59,400	420,899	109,963	835,765	246,159	1,481,056	415,522
Irrigated	AUM	0	0	0	0	2,300	7,500	2,300	7,500
Non-irrigated	AUM	224,392	59,400	420,899	109,963	833,465	238,659	1,478,756	408,022
Private forest land grazed	AUM	327,270	48,784	850,962	88,326	429,671	85,970	1,607,903	223,080

Montana Agricultural Statistics and Clark Fork Soil Resource Group survey.

Current production must be shipped out of the study area for processing. Fruit production is limited to Lake and Ravalli Counties. Sweet cherries is the primary fruit crop grown.

Hay crops occupy by far the most acres of cropland in the study area. The trend has been toward alfalfa hay, with reduction in miscellaneous hays. Wild hay has been important in the past. Much of the acreage of wild hay has been improved, and domestic species introduced for higher yields. This has occurred to such an extent that Montana Agricultural Statistics contained no estimates on wild hay in 1971.

THE PROJECTED ECONOMY OF THE CLARK FORK STUDY AREA, 1980, 2000, AND 2020

The OBERS projections of economic activity have become well-known to individuals and agencies involved in planning for the use, management, and development of water and related land resources. The term OBERS was adopted to represent a joint effort by the former Office of Business Economics, U.S. Department of Commerce, and the Economic Research Service of the U.S. Department of Agriculture. Although OBE has become the BEA (Bureau of Economic Analysis), the OBERS designation has been continued.

The 1972 OBERS projections volumes contain estimates for 20 major water resource regions and 205 subareas which have been designated in addition to estimates by states. One of the subareas has pertinence to the Clark Fork Type IV study area. Water Resource Council subarea 1702 conforms to the study area if two counties, one in Idaho and one in Washington, are excluded. A distinction must be made between the Water Resource Council subareas and the subareas of the Clark Fork study area, however. The Montana portion of WRC subarea 1702 is the Clark Fork study area. The study area, for purposes of analysis and presentation of data, was further disaggregated into three subareas, as designated in earlier sections of this report.

The following projections data are based upon the growth rates reflected in the 1972 OBERS series. They are presented as baseline or reference projections for the analysis of resource demands and development needs, and for the evaluation of the costs, benefits, and economic impact of development and management programs and projects. They should be viewed as baseline projections that will, in fact, facilitate consideration of alternative rates and patterns of growth. They should not be viewed as quotas that must be met in the case of projections of food and fiber.

General Assumptions[2/]

The OBERS projections are based on long-run or secular trends, and ignore the cyclical fluctuations which characterize the short-run path of the economy.

[2/] U.S. Water Resources Council, OBERS projections, Regional Economic Activity in the United States, Volume 1, Concepts, Methodology, and Summary Data. U.S. Government Printing Office, Washington, D.C., 1972.

The general assumptions that underlie the projections are as follows:

1. Growth of population will be conditioned by a decline of fertility rates from those of the 1962-1965 period.

2. Nationally, reasonably full employment, represented by a 4 percent unemployment rate, will prevail at the points for which projections are made; as in the past, unemployment will be disproportionately distributed regionally, but the extent of disproportionality will diminish.

3. No foreign conflicts are assumed to occur at the projection dates.

4. Continued technological progress and capital accumulations will support a growth in private output per manhour of 3 percent annually.

5. The new products that will appear will be accommodated within the existing industrial classification system.

6. Growth in output can be achieved without ecological disaster, although diversion of resources for pollution control will cause changes in the industrial mix of output.

The regional projections are based on the following additional assumptions:

1. Most factors that have influenced historical shifts in regional "export" industry location will continue into the future with varying degrees of intensity.

2. Trends toward economic area self-sufficiency in local service industries will continue.

3. Workers will migrate to areas of economic opportunities and away from slow-growth or declining areas.

4. Regional earnings per worker and income per capita will continue to converge toward the national average.

5. Regional employment/population ratios will tend to move toward the national ratio.

Projected Population

The OBERS projections of population are based upon the Series C projections issued by the Census Bureau in 1970. The fertility rate per 1,000 women in that series is projected to be a substantial decline from the 1962-1965 level. In spite of the declining fertility rate, Series C projections call for an approximate doubling of the national population between 1968 and the year 2020. The 1970 Census Bureau estimates are just slightly below those issued in 1968, due to the use of a slightly different base.

Projections for regions must, in addition to considering fertility rates, estimate interarea migration. The OBERS series assumed that the major motivating factor in migration is economic opportunity, except in a few areas which attract an especially large number of retired persons. Population, consequently, was projected as a function of change in area employment.

The OBERS population projection was adjusted for use in the Clark Fork study area and its subareas, using the following methodology. The Clark Fork study area has experienced a more rapid rate of population growth than has Bonner and Pend O'Reille Counties, two counties not in the Clark Fork study area, but included in Water Resource Council subarea 1702. The ratio of each subarea's population to total population for WRC subarea 1702 was calculated for decennial census years 1930-1970. A regression analysis was made of that time series, and a projection made to 1980 for the ratio of each subarea. For projection target dates 2000 and 2020, the 1980 ratio was retained. These ratios were applied to the OBERS population projection for WRC subarea 1702. These percentages are listed in table 26.

The population of the Clark Fork study area is projected to increase from 203,618 in 1970 to 284,465 in 2020 (table 27). This represents an increase of 40 percent over the 50-year period. The study area is projected to increase in population at a more rapid rate than the state generally. Average annual increase for the study area is about one-quarter of 1 percent for the 50-year period 1970-2020.

All the subareas of the study area are projected to have population increases. However, there is considerable variation in the rates of change expected. The Flathead subarea is projected to experience the greatest percentage increase in population, with a 51 percent increase during the 50-year period. The Upper Clark Fork subarea is expected to experience a considerably slower growth rate of 20 percent over the same period. The growth rate for the Lower Clark Fork is just under the Flathead, with a projected increase of 48 percent.

Table 26.--Segment population as a ratio to total population for WRC subarea 1702, decennial census 1930-1970 and projected 1980

Item	1930	1940	1950	1960	1970	1980
	Percent of total					
Flathead................	16.81	20.08	22.74	21.78	23.94	25.87
Lower Clark Fork........	23.06	27.16	28.93	31.78	36.73	39.13
Upper Clark Fork........	48.25	40.62	37.16	35.66	29.74	25.71
Bonner, Idaho...........	7.69	8.33	7.45	7.40	6.91	6.82
Pend Oreille, Wash......	4.19	3.81	3.72	3.28	2.68	2.47
WRC Subarea 1702........	100.00	100.00	100.00	100.00	100.00	100.00

Population data from U.S. Census of Population.

Table 27.--Projected population growth, Clark Fork study area, by subarea with comparison, 1970, 1980, 2000, and 2020

Item	1970	1980	2000	2020
	Number			
Flathead subarea...........	53,905	62,166	70,289	81,128
Lower Clark Fork subarea...	82,723	94,029	106,316	122,711
Upper Clark Fork subarea...	66,990	61,781	69,854	80,626
Total Clark Fork study area......................	203,618	217,976	246,459	284,465
Total WRC subarea 1702.....	225,203	240,300	271,700	313,600
Montana....................	694,409	720,000	790,000	902,000

Based on OBERS Series C population projections.

Projected Employment

The assumptions used in projecting population and employment in the OBERS series have application in allocating the OBERS employment projections for WRC subarea 1702 to the Clark Fork study area and its subareas. One such assumption was that growth in population due to in-migration is a function of employment opportunities, except in a few areas which attract an especially large number of retired persons and/or recreational home sites. The Flathead subarea seems, in some degree, to characterize that latter type of growth. The historical employment participation rate (population/employment) for the Flathead subarea has been considerably below that of the Upper and Lower Clark Fork subareas, and the differential is projected to continue into the future (table 28).

Table 28.--Employment participation rate (employment/population) for subareas of Clark Fork study area, by subarea, with comparisons, historic 1940-1970 and projected 1980, 2000, and 2020

Item	1940	1950	1960	1970	1980	2000	2020
	Percent						
Flathead subarea............	29	33	31	31	31	32	33
Lower Clark Fork subarea.....	34	36	35	36	37	38	40
Upper Clark Fork subarea.....	34	38	33	34	35	36	37
Total Clark Fork study area..	33	36	33	34	34	36	37
Total WRC subarea 1702.......				34	34	36	37

Historic data based on U.S. Census of Population. Projections based on OBERS Series C projections.

The long-term employment trends for the study area have an important bearing on the projected economic growth of a region or area. Employment projections for the study area are presented in table 29. Employment in the study area is projected to increase from 69,322 in 1970 to 107,120 in the year 2020, an average annual compound growth rate of about .9 of 1 percent.

Table 29.—Total employment, Clark Fork study area, by subarea, with comparisons, 1970 and projected 1980, 2000, and 2020

Item	1970	1980	2000	2020
	Number			
Flathead subarea	16,785	19,271	22,492	26,772
Lower Clark Fork subarea	29,426	33,316	39,874	48,904
Upper Clark Fork subarea	23,111	21,623	25,147	31,444
Total Clark Fork study area	69,322	74,210	87,513	107,120
Total WRC subarea 1702	75,937	81,800	96,600	114,900

Based on OBERS Series C population projections.

The Lower Clark Fork subarea is projected to experience the highest percentage increase in employment for the 1970-2020 time period, with a 66 percent increase. Although the Flathead subarea is projected to have the smallest percentage of its population employed, it is projected to experience a 59 percent increase in employment by 2020. The projected increase for the Upper Clark Fork for the same period is 36 percent.

Personal Income

The OBERS projections series contain personal income estimates for three projection target dates, 1980, 2000, and 2020. In 1970 there was not a wide divergence in personal per-capita income among the subareas of the Clark Fork study area. Per capita personal income ranged from $2,980 in the Flathead subarea to $3,111 in the Upper Clark Fork, as measured in current dollars, a difference of only $131. This relative uniformity in per-capita income suggests that, by applying the OBERS rate of increase for WRC subarea 1702 to the 1970 personal income figures for 1970, a projection for the study area could be obtained which would be consistent with the OBERS framework and be adequate for planning purposes (table 30). The projections will, in some degree, indicate the area's potential as a consumer market, and somewhat of a measure of the ability of an area to support public service expenditures.

Table 30.--Personal income, total and per capita, Clark Fork study area by subarea, 1970 and projected 1980, 2000, and 2020 (1967 constant dollars)

Item	1970		1980		2000		2020	
	Per capita	Total	Per capita	Total	Per capita	Total	Per capita	Total
	Dollars	1,000 dollars	Dollars	1,000 dollars	Dollars	1,000 dollars	Dollars	1,000 dollars
Flathead subarea..........	2,637	142,147	3,852	239,463	7,136	501,582	12,930	1,048,985
Lower Clark Fork subarea...	2,639	218,306	3,855	362,482	7,142	759,309	12,941	1,588,003
Upper Clark Fork subarea...	2,752	184,356	4,020	248,360	7,447	520,203	13,493	1,087,886
Total Clark Fork study area	2,676	544,809	3,901	850,305	7,227	1,781,094	13,094	3,724,874
WRC subarea 1702..........	2,696	607,101	3,744	899,900	6,936	1,885,100	12,568	3,942,300
Montana..................	2,991	2,077,237	4,104	2,955,000	7,363	5,817,000	13,055	11,776,000

Based upon OBERS Series C projections.

The OBERS projections of personal income are stated in 1967 dollars. The 1970 data for the study area were adjusted to 1967 dollars to provide the base from which the extensions were made.

Personal income for the Clark Fork study area is projected to increase from approximately $2.1 billion in 1970 to $11.8 billion in 2020, as measured in constant 1967 dollars. This expansion represents an average annual increase over the 50-year period of 3.9 percent. This long-term rate is slightly higher than the rate projected for the state, 3.5 percent over the same period.

Per capita income is projected to increase at a slightly lower average annual rate for the 50-year period, 3.2 percent in the study area, compared to 3.0 percent for the state overall. The highest rate of expansion is projected for the period 1970-1980, after which the rate of increase slackens somewhat.

Agricultural Projections

Three basic elements of national demand were considered in projecting demands for food and fiber: domestic food use, domestic nonfood use, and net foreign market use. Projections of domestic food requirements were, in turn, based upon the Series C population projections and a per capita consumption rate which was closely related to projected levels of per capita income. The domestic nonfood uses of crops are primarily seed and manufacturing. Foreign market use of American produced agricultural products were embodied in the projected demand for food and fiber. Foreign trade is subject to considerable variation from year to year. The long-range projection, therefore, had to be essentially an interpretation of the international trade policies as they existed when the projections were made. The basic assumption for projection of foreign markets was that, for the years beyond 1980, U.S. exports will continue to increase but will represent a smaller share of total U.S. production.

After consideration of all uses of agricultural products, a projection was made of national demand for food and fiber for 1980, 2000, and 2020. A state and subarea projection was then constructed. The state projections were obtained by extending a 1947-1970 historic trend. This extension was, in some cases, modified after a land availability check was made for the state under consideration. The trends for states were extended for three projection target dates, 1980, 2000, and 2020. Projections for subareas involved an examination of the historical percentage distribution of state production among its subareas. The percentage relationship for each subarea with state totals was estimated for a historic trend and projected to 1980. The 1980 percentage relationship was held constant for projection points 2000 and 2020.

A primary advantage of the OBERS projections of food and fiber requirements is the nationally consistent nature of the estimates. A change in one region suggests corresponding adjustments in one or more other regions. If water resources planning proceeded in each of the water resource regions without due consideration of impacts forthcoming in other regions, the national interest would not be served.

Projected Demand for Food and Fiber

The estimates presented here are projections for the Montana portion of WRC subarea 1702, which conforms to the Clark Fork study area. For a projection of requirements or demand, there is no attempt to provide a further disaggregation for the subareas of the Clark Fork study area. The basic assumptions for the projections are strained when applied to areas as small as the Montana portion of WRC subarea 1702. It is felt they would not support a further disaggregation to the subareas of the study area.

For the Clark Fork study area, small grains production is projected to continue its relative importance (table 31). Wheat, oats, and barley production will increase significantly throughout the projection period. The projection based on historic shares of national production results in a projected increase in sugar beet production for the study area. Actually, the future of this crop is very uncertain in the Clark Fork. Alternative projections should reflect this uncertainty.

Hay crops for an expanding livestock industry are projected to increase production 123 percent over the projection period. Red meat production is projected to increase over 150 percent. Lamb and wool production shows a halt to a declining trend, and attains a modest increase of 13 percent. Production of dairy products in the study area is projected to decline.

Table 31.--Agricultural production by commodity, Clark Fork study area, current normal and projected 1980, 2000, and 2020

Item	Unit	Current normal	1980	2000	2020
		Thousands			
Wheat....................	Bu.	1,965.5	2,719.3	3,206.9	3,601.0
Rye......................	Bu.	1.5	4.0	3.6	3.2
Corn for silage..........	Tons	18.2	36.4	53.8	72.4
Oats.....................	Bu.	488.3	1,352.8	1,687.4	1,931.3
Barley...................	Bu.	2,248.7	2,635.8	3,737.0	4,674.3
Fruit,non-citrus........	Tons	4.9	0.7	0.2	0.2
Vegetables..............	Cwt.	22.8	14.0	7.8	3.4
Sugar beets.............	Tons	12.6	41.5	66.1	96.9
Irish potatoes..........	Cwt.	1,011.8	677.1	689.9	690.8
Hay crops...............	Tons	672.8	707.8	934.6	1,543.5
Beef and veal...........	Lbs. L/wt.	108,370.7	151,927.1	206,217.3	279,828.4
Pork....................	Lbs. L/wt.	10,054.8	12,317.2	16,657.1	21,977.4
Lamb and mutton.........	Lbs. L/wt.	1,432.3	1,520.9	1,558.5	1,632.4
Replacement chickens.....	Lbs. L/wt.	1,070.3	906.9	583.5	372.9
Eggs....................	Number	50,000.0	49,000.9	46,000.0	42,000.5
Milk....................	Pounds	152,000.0	90,000.8	67,000.7	50,000.5

Current normal data from Montana Agricultural Statistics 1968, 1969, and 1970, and U.S. Census of Agriculture, 1969. Projections from unpublished material supporting the agricultural portion of the Water Resources Council OBERS projections, Series C.

Adequacy of the Land Resource Base

In assessing the adequacy of the land resources in the study area to produce the various quantities of food and fiber expressed in the OBERS series, the analysis shifts to a consideration of production potential, or supply analysis. This shift in emphasis permits a consideration of each subarea's potential in producing the projected requirements for the study area as a whole.

The analysis undertaken assumes the current normal cropping pattern is continued throughout the projection period. Crop yields were projected for 1980, 2000, and 2020 (table 32). The OBERS crop yields for the State of Montana were reviewed and the index of change applied to the current normal yields per acre, by crop, for each of the subareas of the Clark Fork study area. The OBERS state crop yield projections were developed using several basic assumptions. One such assumption was that the rapid rate of increase in research and resource development in agriculture that occurred in the 1947-70 period will continue at a slower rate of increase in the 1970-2020 period. The general assumption is that yields will increase at a decreasing rate.

The general technique used to estimate the state yield projections under the baseline assumption was a combined linear and "Spillman Type" curvilinear regression model. Basic data used in yield projections were from the USDA Statistical Reporting Service composite yield series.

Table 33 displays each subarea's potential production using constant, current normal, cropping pattern, and the projected yields contained in table 31. Total potential production is added for the subareas for a Clark Fork study area total, and a comparison with the OBERS projection made. The difference between the potential and OBERS was converted to an acreage differential in terms of both irrigated and dry land. The two estimates are mutually exclusive. Each estimate gives the acreage represented by the difference in production potential and the OBERS projection when the entire difference is attributed to, first, irrigated land, and secondly, dry land. Crops not ordinarily grown on dry land were excluded from the dry land column.

Table 32.--Average yields per acre, selected crops, Clark Fork study area, by subarea, current normal and projected 1980, 2000, and 2020

Item	Unit	Current normal	1980	2000	2020	Index of change, CN = 100 1980	2000	2020
IRRIGATED CROPS:								
Wheat, winter:								
Flathead subarea..........	Bu.	51.9	64.3	80.9	92.9	124	156	179
Lower Clark Fork subarea..	Bu.	53.9	66.8	84.1	96.5	124	156	179
Upper Clark Fork subarea..	Bu.	51.0	63.2	79.6	91.3	124	156	179
Total Clark Fork study area.................	Bu.	52.6	65.2	82.0	94.1	124	156	179
Wheat, spring:								
Flathead subarea..........	Bu.	39.8	49.4	62.1	71.2	124	156	179
Lower Clark Fork subarea..	Bu.	38.2	47.4	59.6	68.4	124	156	179
Upper Clark Fork subarea..	Bu.	43.6	54.1	68.0	78.0	124	156	179
Total Clark Fork study area.................	Bu.	40.7	50.5	63.5	72.9	124	156	179
Oats:								
Flathead subarea..........	Bu.	63.4	77.9	95.7	109.0	123	151	172
Lower Clark Fork subarea..	Bu.	64.3	79.0	97.1	110.6	123	151	172
Upper Clark Fork subarea..	Bu.	57.0	70.1	86.1	98.0	123	151	172
Total Clark Fork study area.................	Bu.	58.2	71.6	87.9	100.1	123	151	172
Barley:								
Flathead subarea..........	Bu.	60.1	73.3	91.4	104.0	122	152	173
Lower Clark Fork subarea..	Bu.	62.5	76.3	95.0	108.1	122	152	173
Upper Clark Fork subarea..	Bu.	48.3	58.9	73.4	83.6	122	152	173
Total Clark Fork study area.................	Bu.	57.1	69.7	86.8	98.8	122	152	173
Corn for silage:								
Flathead subarea..........	Tons	16.4	18.9	22.5	24.9	115	136	152
Lower Clark Fork subarea..	Tons	17.5	20.1	24.0	26.6	115	136	152
Total Clark Fork study area.................	Tons	16.9	19.4	23.0	25.7	115	136	152

(continued)

Table 32.--Average yields per acre, selected crops, Clark Fork study area, by subarea, current normal and projected 1980, 2000, and 2020 (continued)

Item	Unit	Current normal	1980	2000	2020	Index of change, CN = 100 1980	2000	2020
Irish potatoes:								
Flathead subarea..........	Cwt.	235.6	261.5	289.8	313.3	111	123	133
Lower Clark Fork subarea..	Cwt.	206.7	229.4	254.2	274.9	111	123	133
Upper Clark Fork subarea..	Cwt.	180.2	200.0	221.6	239.7	111	123	133
Total Clark Fork study area.................	Cwt.	216.3	240.1	266.0	287.7	111	123	133
Sugar beets:								
Lower Clark Fork subarea..	Tons	18.0	20.0	22.9	24.8	112	127	138
Total Clark Fork study area.................	Tons	18.0	20.0	22.9	24.8	112	127	138
Alfalfa hay:								
Flathead subarea..........	Tons	3.7	4.2	5.0	5.6	114	135	151
Lower Clark Fork subarea..	Tons	3.1	3.5	4.2	4.7	114	135	151
Upper Clark Fork subarea..	Tons	2.6	3.0	3.5	3.9	114	135	151
Total Clark Fork study area.................	Tons	3.0	3.4	4.1	4.5	114	135	151
All other hay:								
Flathead subarea..........	Tons	1.9	2.2	2.6	2.9	114	135	151
Lower Clark Fork subarea..	Tons	1.9	2.2	2.6	2.9	114	135	151
Upper Clark Fork subarea..	Tons	1.6	1.8	2.2	2.4	114	135	151
Total Clark Fork study area.................	Tons	1.8	2.0	2.4	2.7	114	135	151
Fruit, non-citrus:								
Flathead subarea..........	Tons	3.7	4.4	5.1	5.7	118	138	153
Lower Clark Fork subarea..	Tons	2.1	2.5	2.9	3.2	118	138	153
Total Clark Fork study area.................	Tons	2.8	3.3	3.9	4.3	118	138	153

(continued)

Table 32.--Average yields per acre, selected crops, Clark Fork study area, by subarea, current normal and projected 1980, 2000, and 2020 (continued)

Item	Unit	Current normal	1980	2000	2020	Index of change, CN = 100		
						1980	2000	2020
NON-IRRIGATED CROPS:								
Wheat, winter:								
Flathead subarea..........	Bu.	40.9	50.6	63.7	73.2	124	156	179
Lower Clark Fork subarea..	Bu.	28.7	35.5	44.7	51.4	124	156	179
Upper Clark Fork subarea..	Bu.	24.5	30.3	38.1	43.8	124	156	179
Total Clark Fork study area.................	Bu.	36.8	45.6	57.4	65.9	124	156	179
Wheat, spring:								
Flathead subarea..........	Bu.	27.0	33.5	42.1	48.3	124	156	179
Lower Clark Fork subarea..	Bu.	23.0	28.5	35.9	41.1	124	156	179
Upper Clark Fork subarea..	Bu.	22.8	28.3	35.6	40.8	124	156	179
Total Clark Fork study area.................	Bu.	25.3	31.4	39.5	45.3	124	156	179
Oats:								
Flathead subarea..........	Bu.	49.0	65.7	85.3	98.9	134	174	202
Lower Clark Fork subarea..	Bu.	38.9	52.1	67.7	78.6	134	174	202
Upper Clark Fork subarea..	Bu.	38.1	51.0	66.3	76.9	134	174	202
Total Clark Fork study area.................	Bu.	44.8	60.0	78.0	90.5	134	174	202
Barley:								
Flathead subarea..........	Bu.	47.0	54.0	67.2	76.1	115	143	162
Lower Clark Fork subarea..	Bu.	38.1	43.8	54.5	61.7	115	143	162
Upper Clark Fork subarea..	Bu.	32.6	37.5	46.6	52.8	115	143	162
Total Clark Fork study area.................	Bu.	43.9	50.5	62.8	71.1	115	143	162
Alfalfa hay:								
Flathead subarea..........	Tons	1.6	1.8	2.1	2.4	115	134	148
Lower Clark Fork subarea..	Tons	1.4	1.6	1.9	2.1	115	134	148
Upper Clark Fork subarea..	Tons	1.4	1.6	1.9	2.1	115	134	148
Total Clark Fork study area.................	Tons	1.5	1.7	2.0	2.2	115	134	148

(continued)

Table 32.--Average yields per acre, selected crops, Clark Fork study area, by subarea, current normal and projected 1980, 2000, and 2020 (continued)

Item	Unit	Current normal	1980	2000	2020	Index of change, CN = 100		
						1980	2000	2020
All other hay:								
Flathead subarea..........	Tons	1.4	1.6	1.9	2.1	115	134	148
Lower Clark Fork subarea..	Tons	1.3	1.5	1.7	1.9	115	134	148
Upper Clark Fork subarea..	Tons	1.2	1.4	1.6	1.8	115	134	148
Total Clark Fork study area.................	Tons	1.3	1.5	1.7	1.9	115	134	148

Table 33.--Projected production potential with current normal crop average and projected crop yields, compared with OBERS projections, Clark Fork study area by subarea, 1980, 2000, and 2020

Item	Unit	Flathead subarea	Lower Clark Fork subarea	Upper Clark Fork subarea	Clark Fork study area	OBERS projection	Percent of OBERS	Difference in terms of acres: Irrigated land	Difference in terms of acres: Non-irrigated land
1980									
Wheat	Bu.	1,669,072	613,306	166,898	2,449,276	2,719,300	90.0	4,848	6,222
Corn for silage	Ton	8,203	13,387	0	21,590	36,400	59.3	763	1/
Oats	Bu.	306,899	187,864	147,596	642,359	1,352,800	47.5	9,922	11,841
Barley	Bu.	1,540,230	812,379	327,191	2,679,800	2,635,800	101.7	-631	-871
Fruit, non-citrus	Ton	3,080	2,075	0	5,155	700	736.4	0	1/
Sugar beets	Ton	0	14,000	0	14,000	41,500	33.7	1,375	1/
Irish potatoes	Cwt	688,268	141,081	289,200	1,118,549	677,100	165.2	-1,838	1/
Hay	Ton	284,336	265,497	257,624	807,457	707,800	114.1	-29,310	-58,621
ACRES TOTAL								-14,871	-41,429
2000									
Wheat	Bu.	2,100,610	772,132	209,841	3,082,583	3,206,900	96.1	1,776	2,277
Corn for silage	Ton	9,765	15,984	0	25,749	53,800	47.8	1,220	1/
Oats	Bu.	390,481	236,339	183,238	810,058	1,687,400	48.0	9,981	11,262
Barley	Bu.	1,917,660	1,011,303	407,300	3,336,263	3,737,000	89.3	4,617	-6,381
Fruit, non-citrus	Ton	3,570	2,407	0	5,977	200	—	0	1/
Sugar beets	Ton	0	16,030	0	16,000	66,100	24.2	2,188	1/
Irish potatoes	Cwt	762,754	156,333	320,433	1,239,520	689,900	179.6	-2,066	1/
Hay	Ton	336,609	315,803	308,422	926,886	934,600	102.8	-6,398	-13,117
ACRES TOTAL								11,318	-5,959
2020									
Wheat	Bu.	2,413,113	887,067	240,763	3,540,943	3,601,000	98.3	747	959
Corn for silage	Ton	10,807	17,716	0	28,523	72,400	39.4	1,707	1/
Oats	Bu.	449,868	271,404	209,331	930,603	1,931,300	48.2	9,996	11,057
Barley	Bu.	2,174,160	1,149,138	462,981	3,786,279	4,674,300	81.0	8,988	12,490
Fruit, non-citrus	Ton	3,990	2,656	0	6,646	200	—	0	1/
Sugar beets	Ton	0	17,360	0	17,360	96,900	17.9	3,207	1/
Irish potatoes	Cwt	824,606	169,063	346,606	1,340,275	690,800	194.0	-2,257	1/
Hay	Ton	377,719	352,609	340,477	1,070,805	1,543,500	69.4	105,043	214,861
ACRES TOTAL								127,431	239,367

1/ Not ordinarily grown on dry land.

Summarized from data presented in previous tables.

Positive acreage figures denote the additional acres required to produce the OBERS quantity. Negative acreage figures indicate the OBERS projected quantity can be produced with a given acreage reduction, compared to current normal acreage.

It will be noted that no estimates were made for orchards. The assumption was that the land occupied by orchards would not be shifted to other crops if fruit production were discontinued.

By 1980, the OBERS projected level of production could be attained with fewer acres than the current normal. Assuming the projected crop yields, additional acres of cropland would be required to produce the OBERS level in both Year 2000 and 2020. The preliminary nature of these projections is emphasized. A more specific projection of additional irrigated and dry cropland will be developed, using a least-cost linear programming model during later stages of the study.

A detailed survey was undertaken in the Clark Fork study area to determine current use and productivity of land. The data were gathered on the basis of soil resource groups - that is, groupings of soil which have similar productive capabilities, response to fertilizers, management, and land treatment measures. These data on soil resource groups are currently being processed, and will be of value in determining availability of land which has potential for development as cropland, both irrigated and dry land.

Although the crop and livestock projections in the OBERS series may not be interpreted as a quota which must be produced in the study area, some analysis of the study area's potential to attain that level of production does seem desirable. Other alternative levels of projected production will be examined in detail as the Type IV study progresses. The data in table 32 present two alternative projections. One level of projected output is based upon the current normal acreage and cropping patterns, and projected yields, or a non-development projection. The second projection in table 32 is the OBERS level. The data indicate some additional land would have to be developed to attain the OBERS projected level of output for Years 2000 and 2020.

Data in table 25 indicate that within the study area there are 99,600 acres of non-irrigated pasture and 1,489,900 acres of range land. Of this acreage, there are approximately 164,900 acres classified as Class I, II, and III under the Soil Conservation Service classification system. These lands may have some potential for development, but detailed studies would be necessary to relate them to available water supply and feasibility for development.

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